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TECHNICAL REPORT, H-75-4

LOS ANGELES AND LONG BEACH HARBORS MODEL STUDY.

Report 5 -

TIDAL VERIFICATION AND BASE CIRCULATION TE APPENDIX B: SURFACE-CURRENT PATTERN MOSAICS

William H./McAnally, Jr.

Hydraulics Laboratory

U. S. Army Engineer Waterways Experiment Station P. O. Box 631, Vicksburg, Miss. 39180

> September 1975 | Report 5 of a Series

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Prepared for U. S. Army Engineer District, Los Angeles Los Angeles, Calif. 90053

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FECHNICAL REPORT, H-75-4

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Report 5 -

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This appendix contains surface-current pattern mosaics of base tidal circulation tests conducted in the physical model of Los Angeles-Long Beach Harbors. Descriptions of the model and tests plus other data are included in the main report.*

Mosaics are included for each hour of a complete tidal cycle under two tidal conditions—a typical spring range tide (7.1-ft diurnal range) and a neap range tide (3.5-ft diurnal range). A plot of tidal elevations for gage LA is shown on the hour 0 mosaic for each tidal condition.

These mosaics, reproduced at about 35 percent of the original size, are 10-sec (400 sec prototype time) time-exposure photographs of confetti floating on the water surface. Confetti streak lengths may be converted to current speed by subtracting the confetti chip width from the length and then using the speed scale shown on each mosaic. A bright light was flashed just before the camera lens was closed, resulting in a bright spot (or dot) at approximately the end of each confetti streak which indicates the direction of flow; however, the dot is not discernible on some of the streaks. Care should be taken not to interpret clusters of confetti as streaks. The text of the main report provides additional information on the use of these mosaics.

^{*} W. H. McAnally, Jr., "Los Angeles and Long Beach Harbors Model Study; Tidal Verification and Base Circulation Tests," Technical Report H-75-4, Report 5, Sep 1975, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

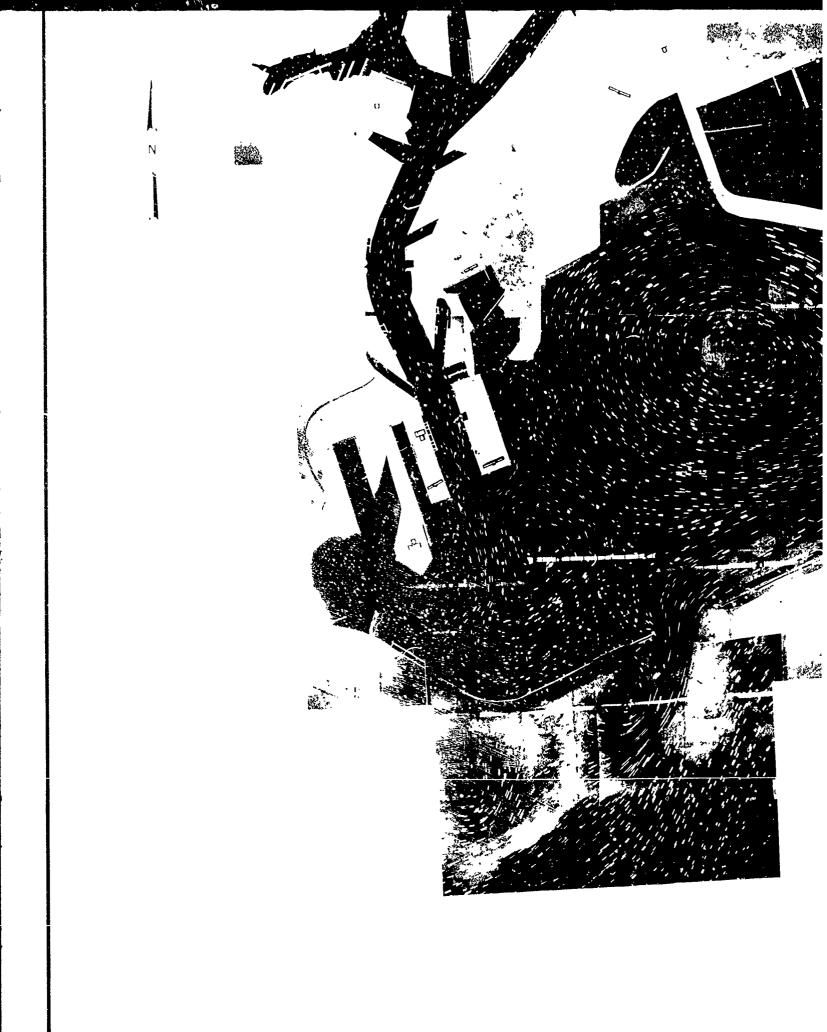


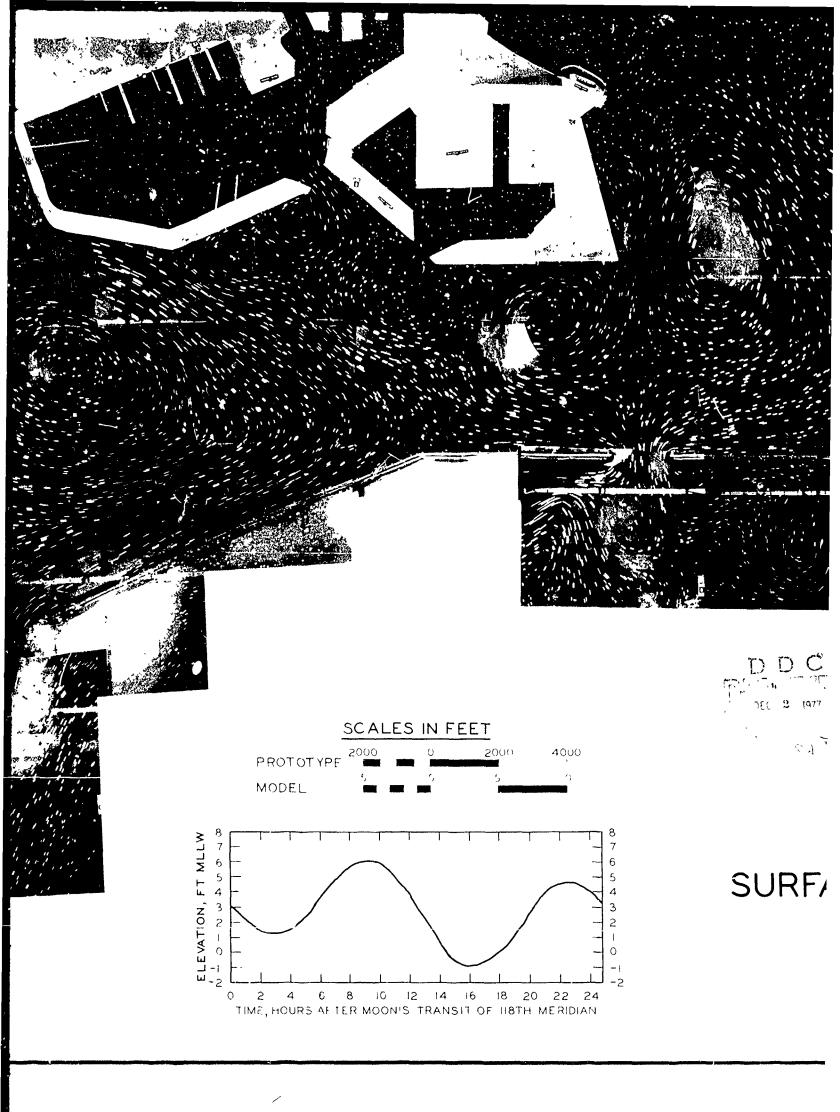


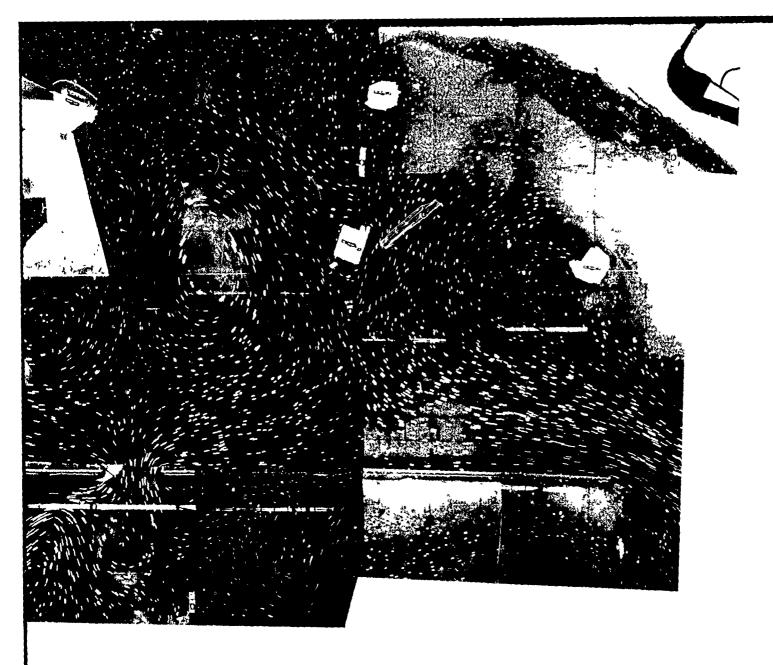
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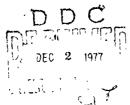


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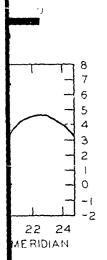
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST SPRING TIDE HOUR 0



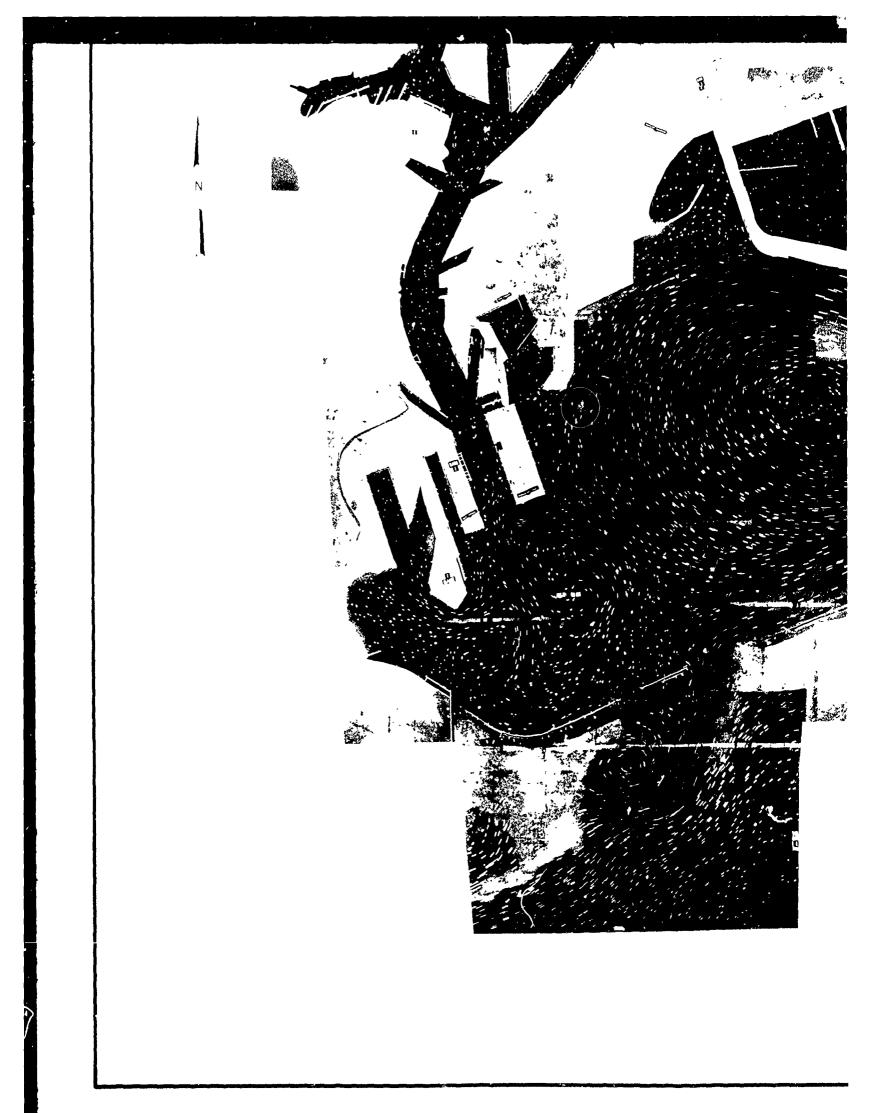
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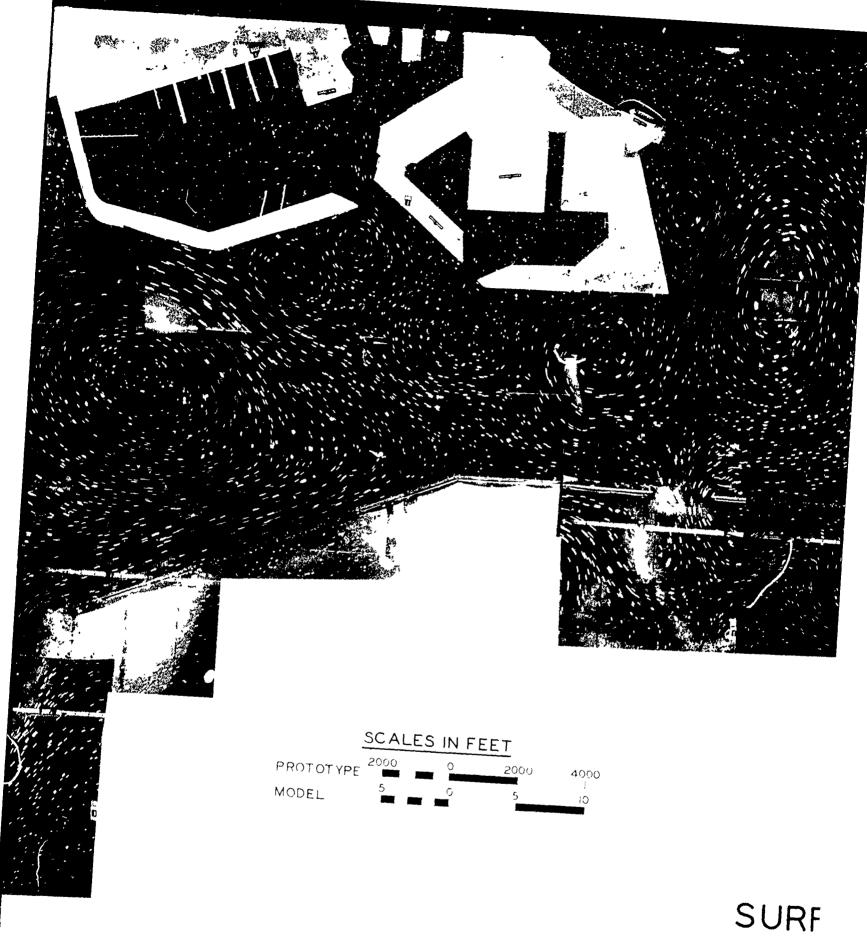


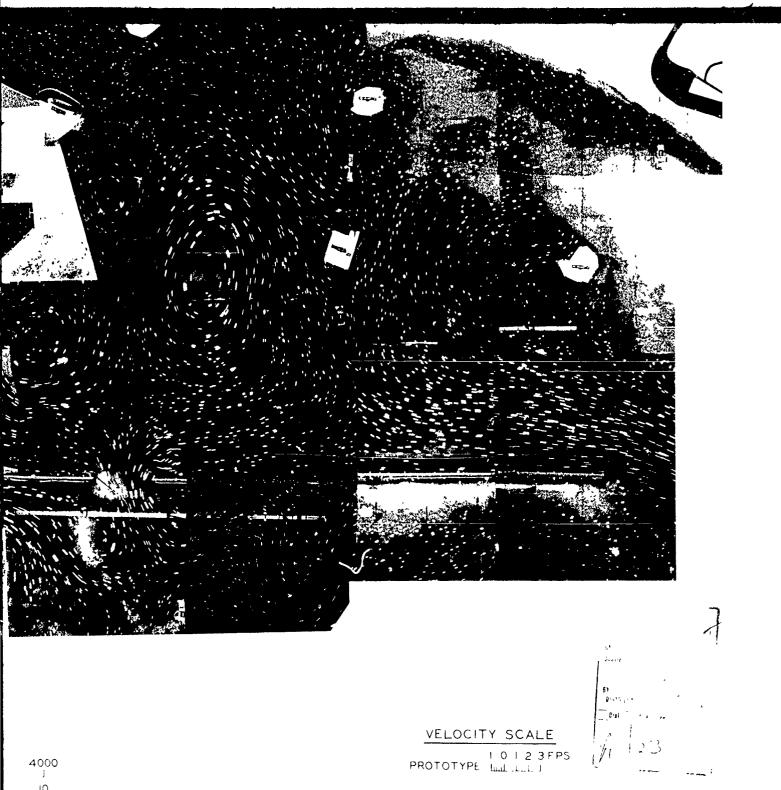




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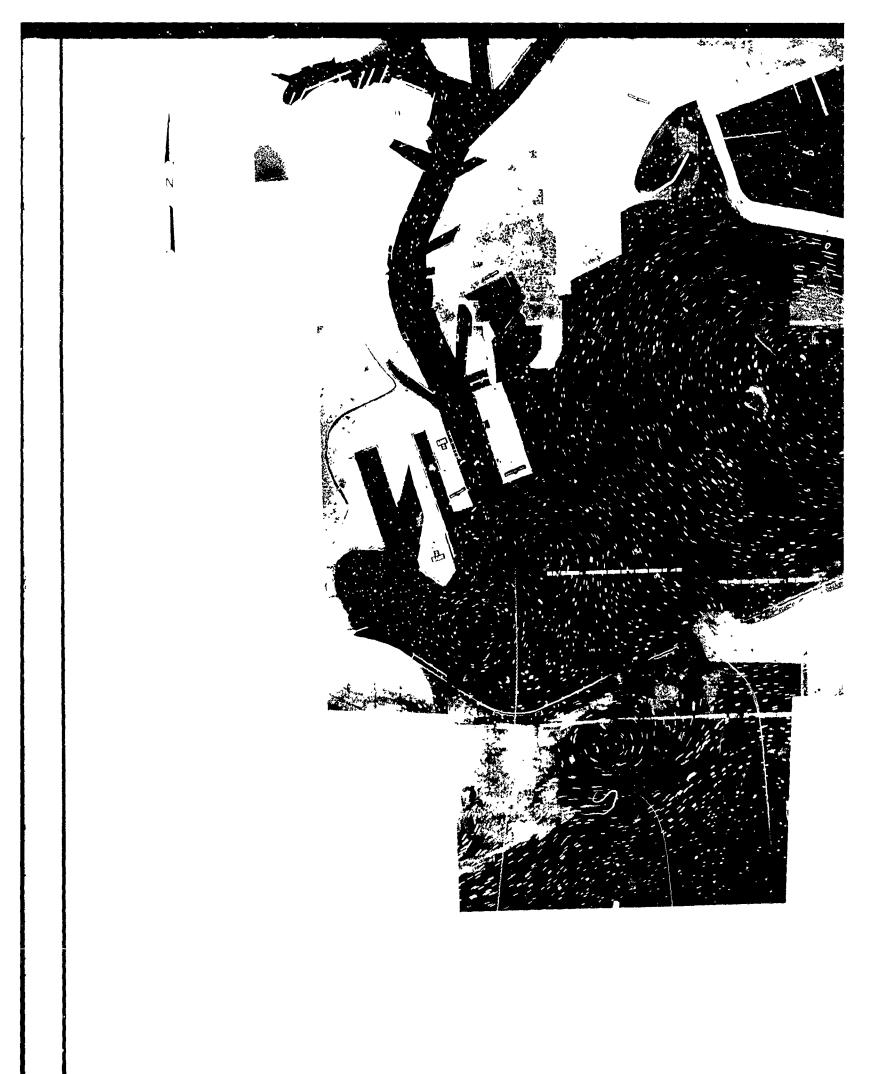
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SURFACE CURRENT PATTERNS



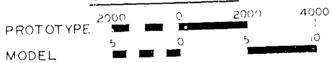








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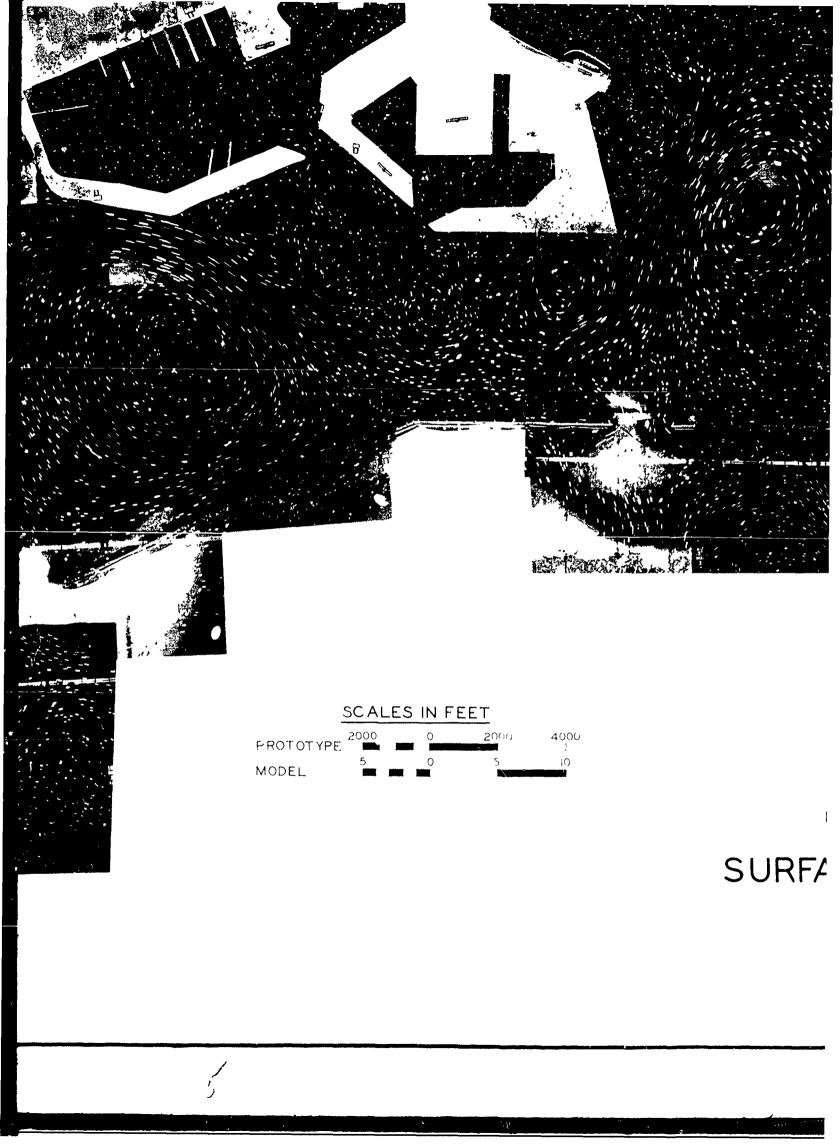
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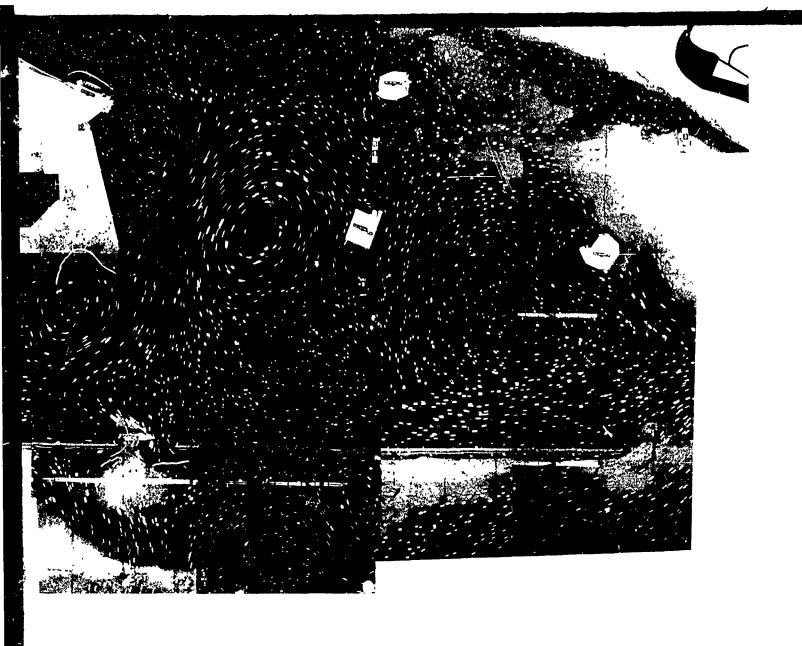












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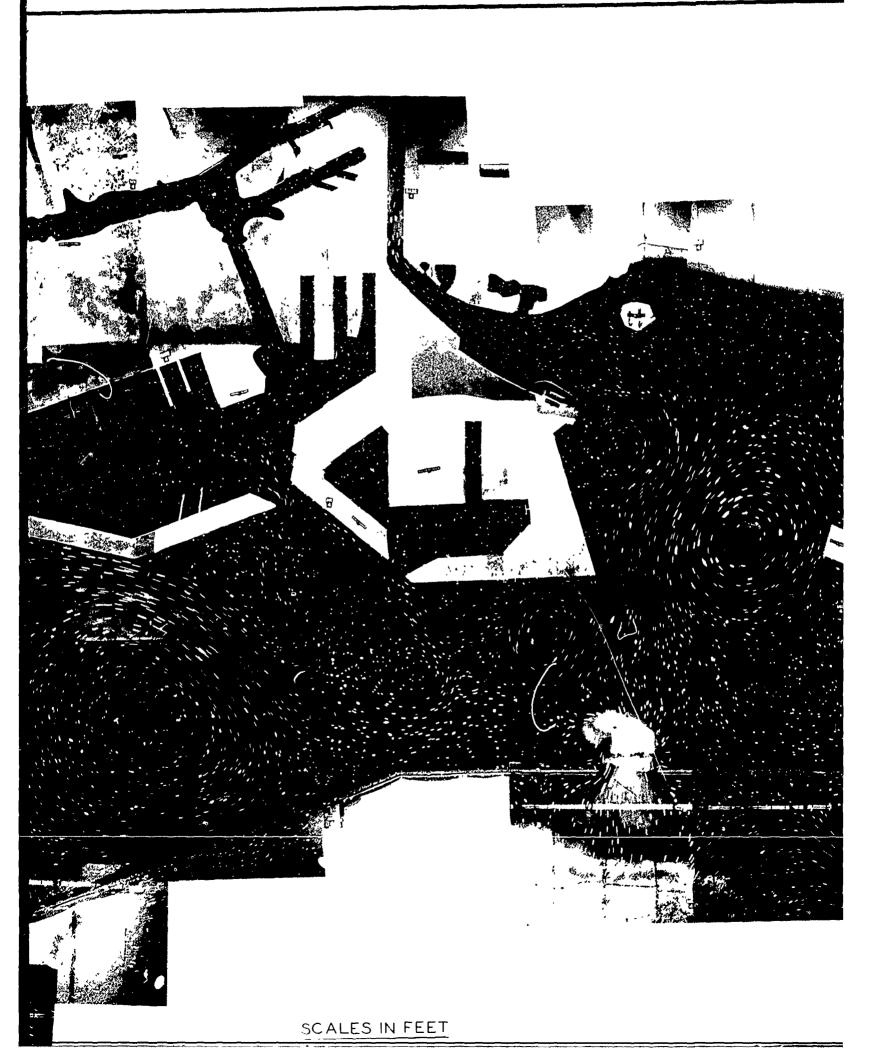
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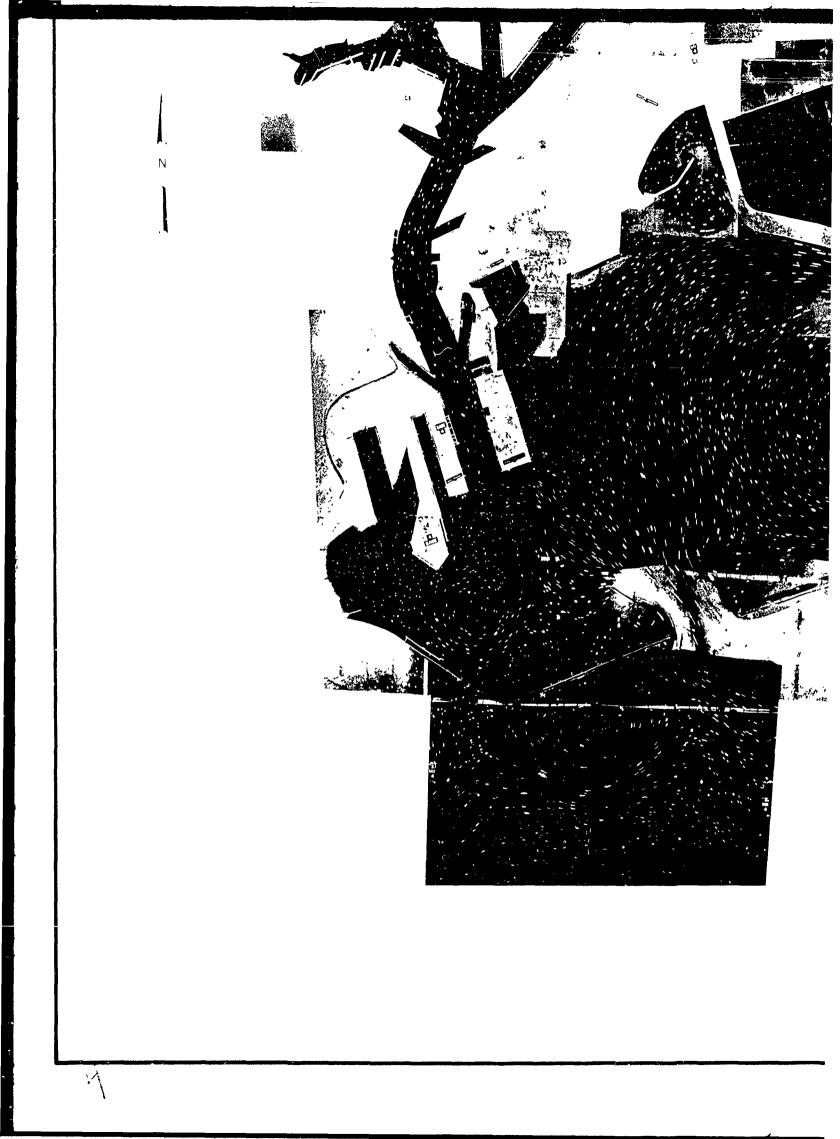
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS













VELOCITY SCALE

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

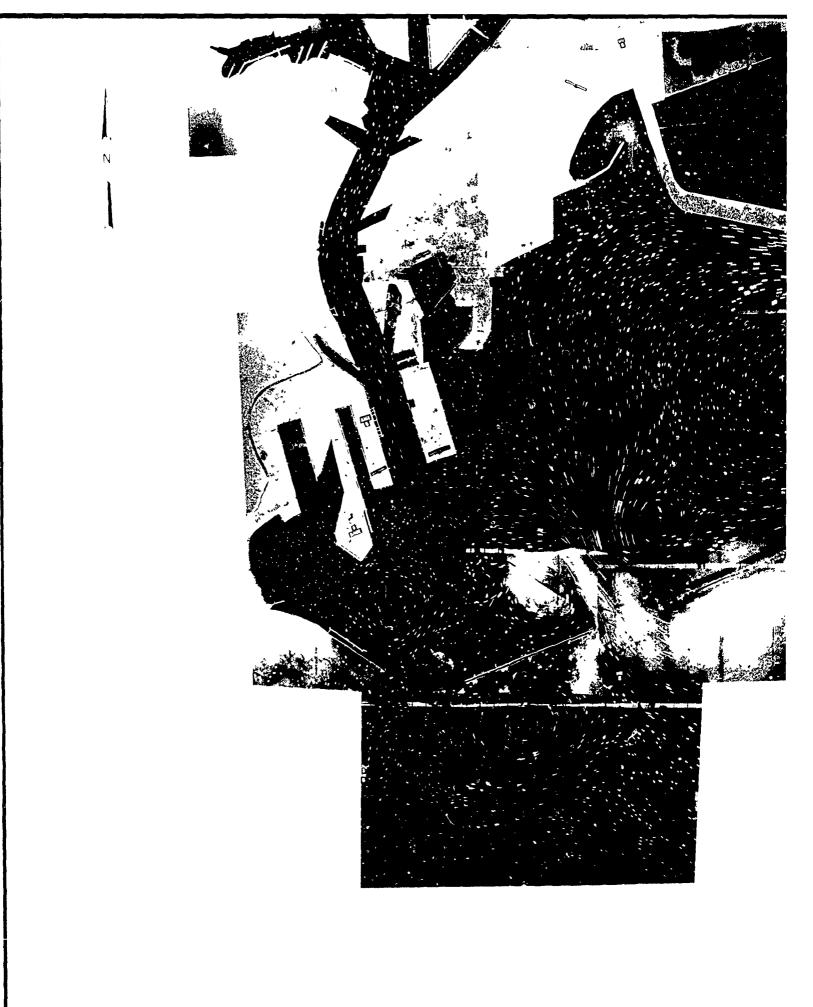
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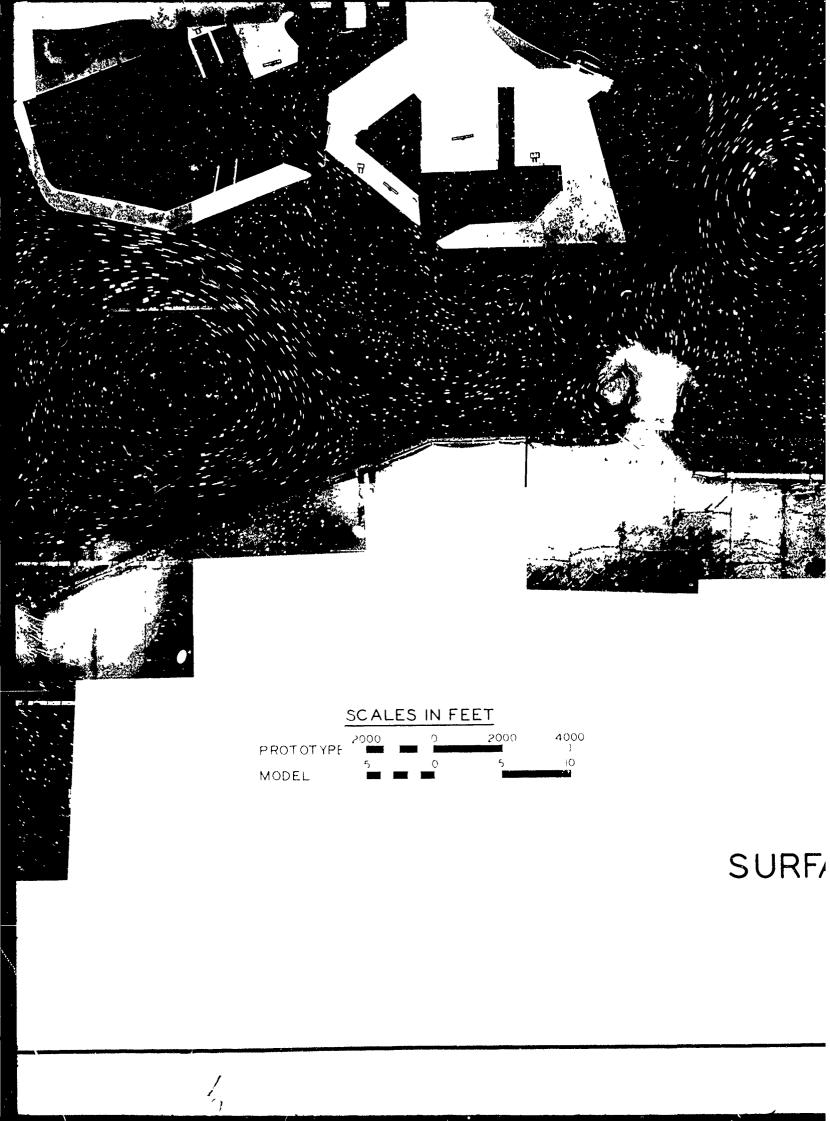


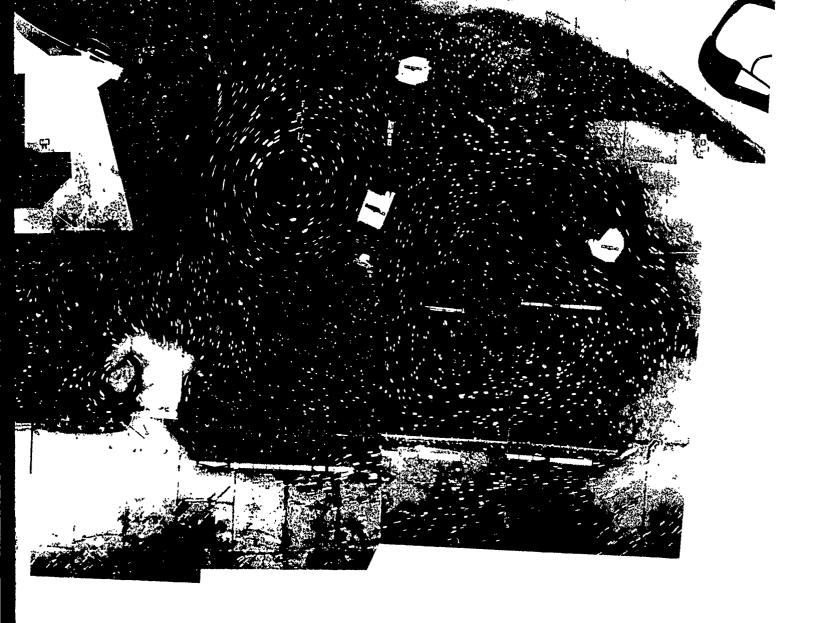


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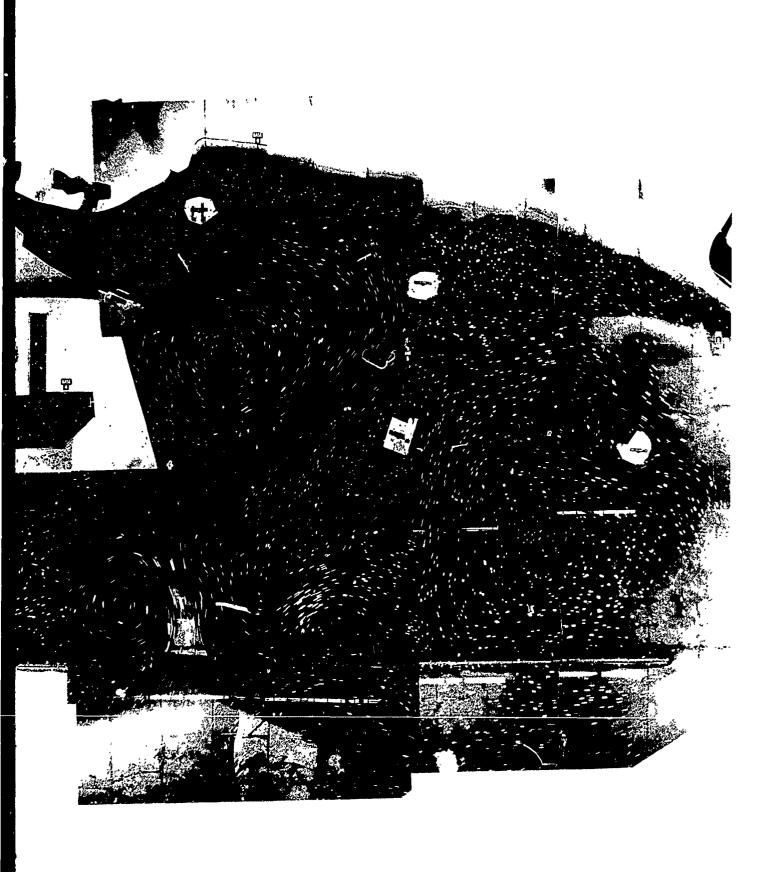
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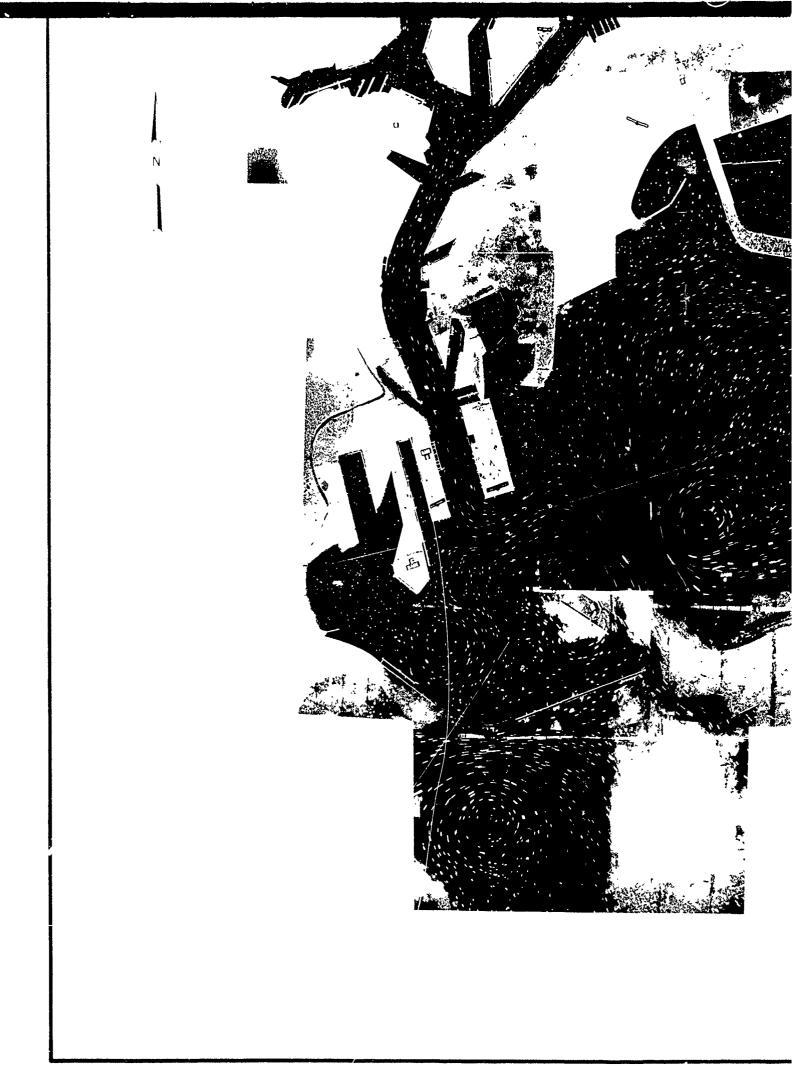
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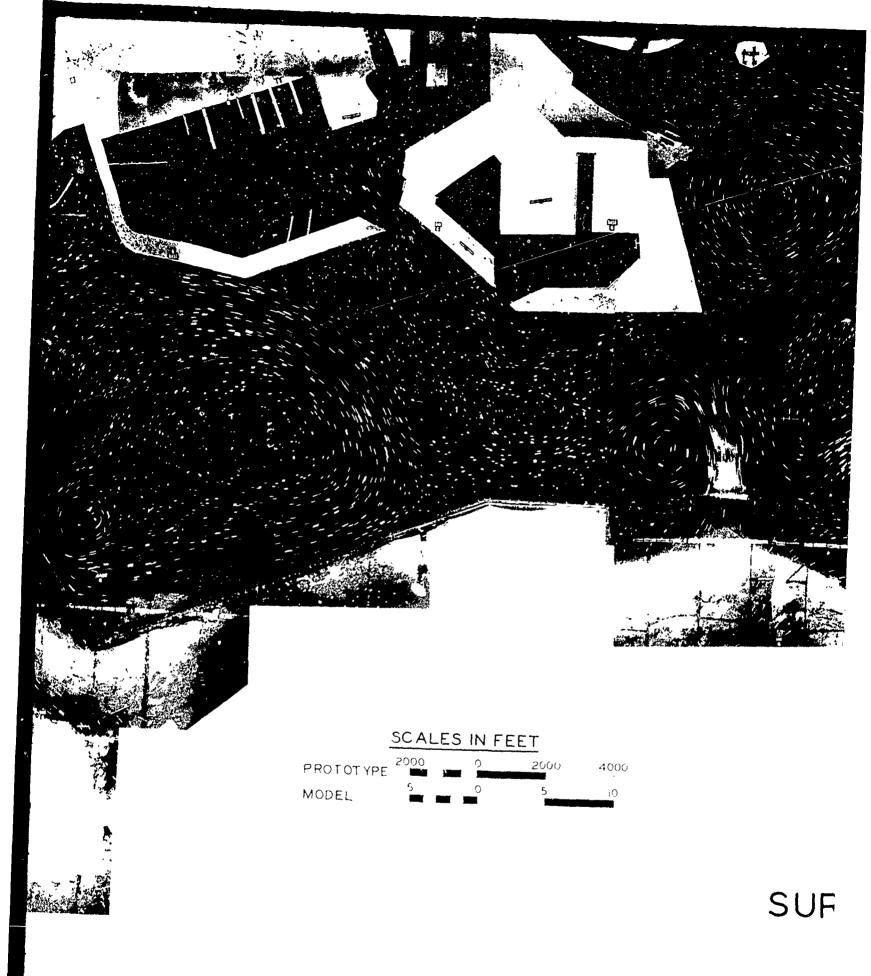
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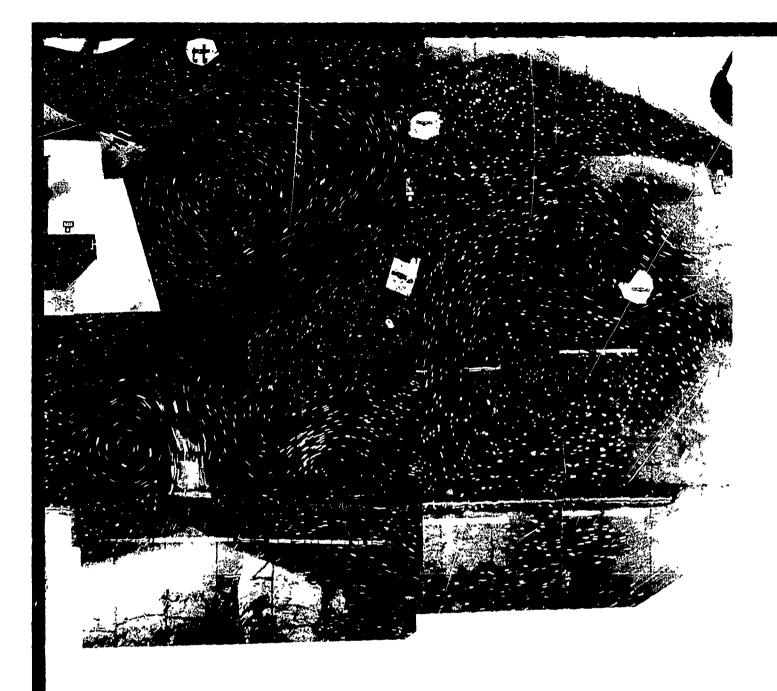












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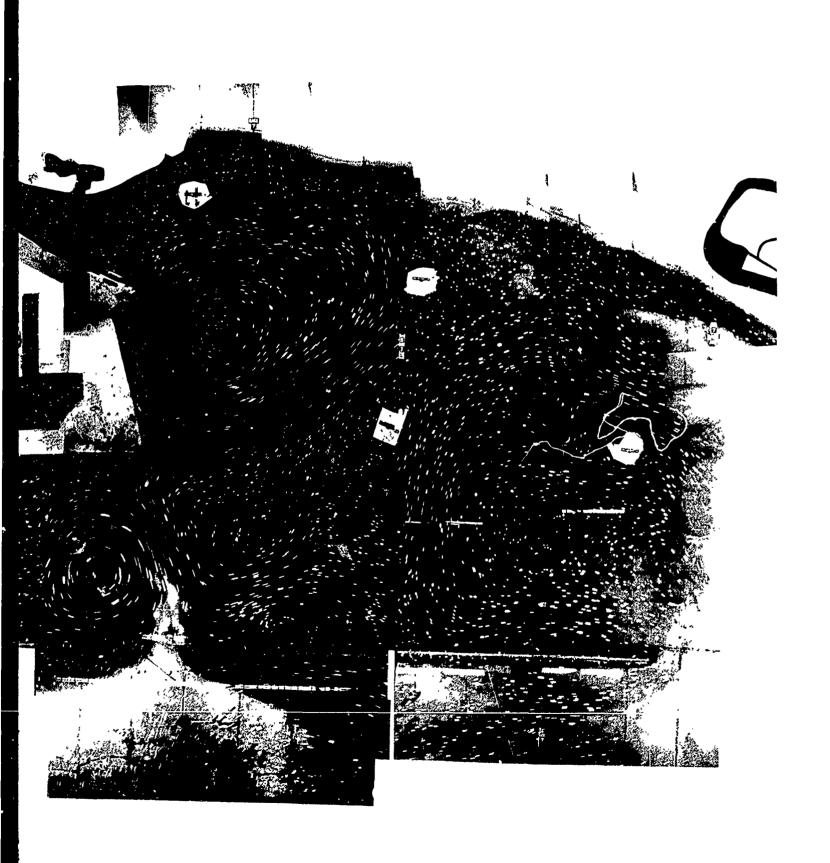
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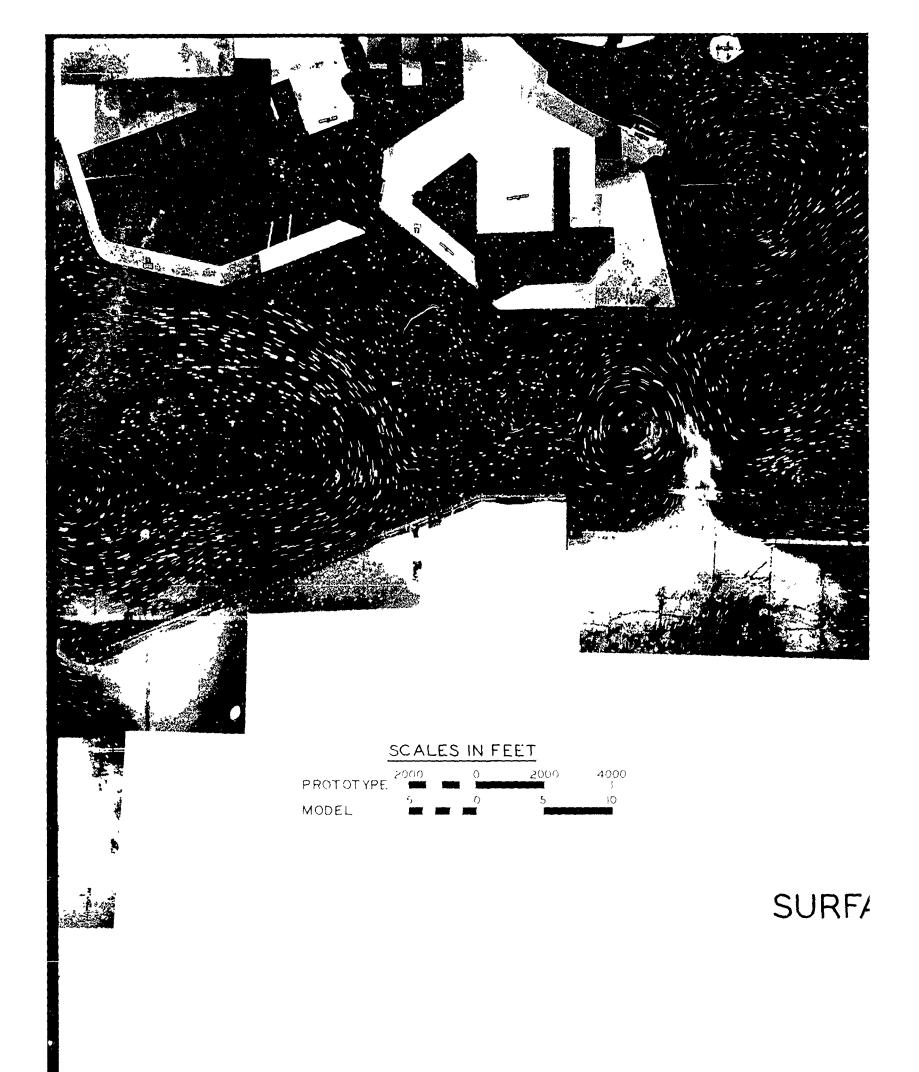
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

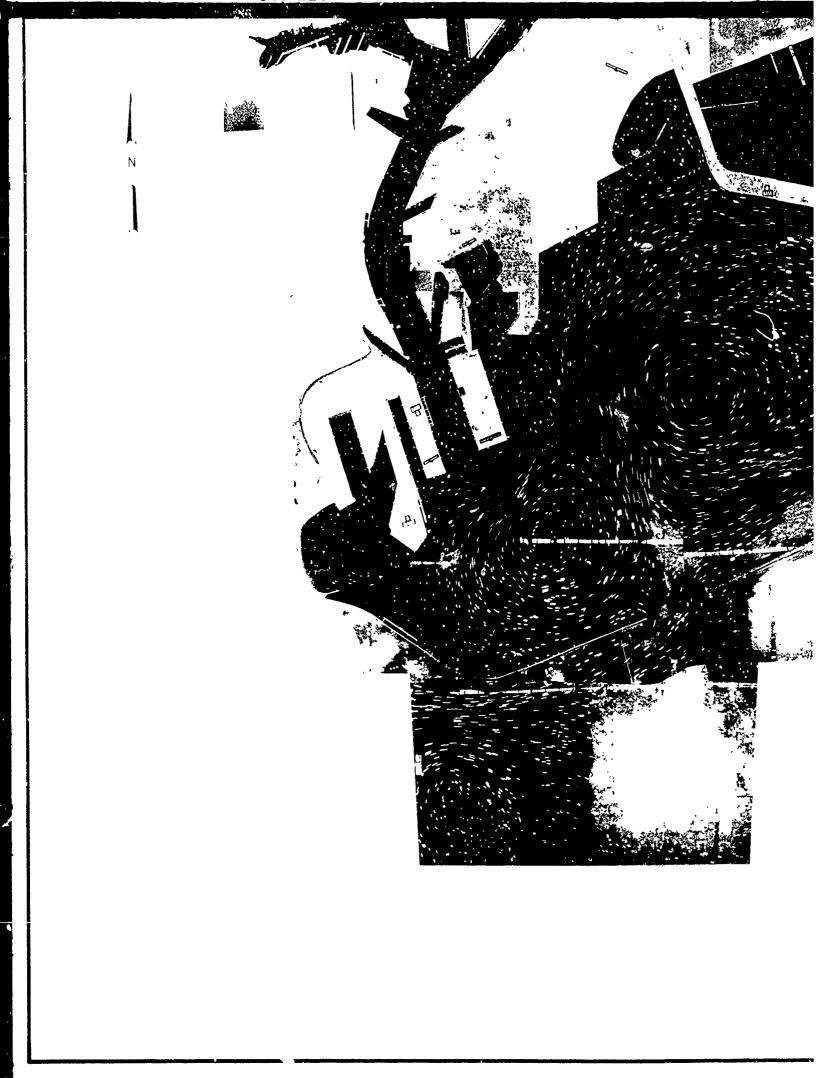
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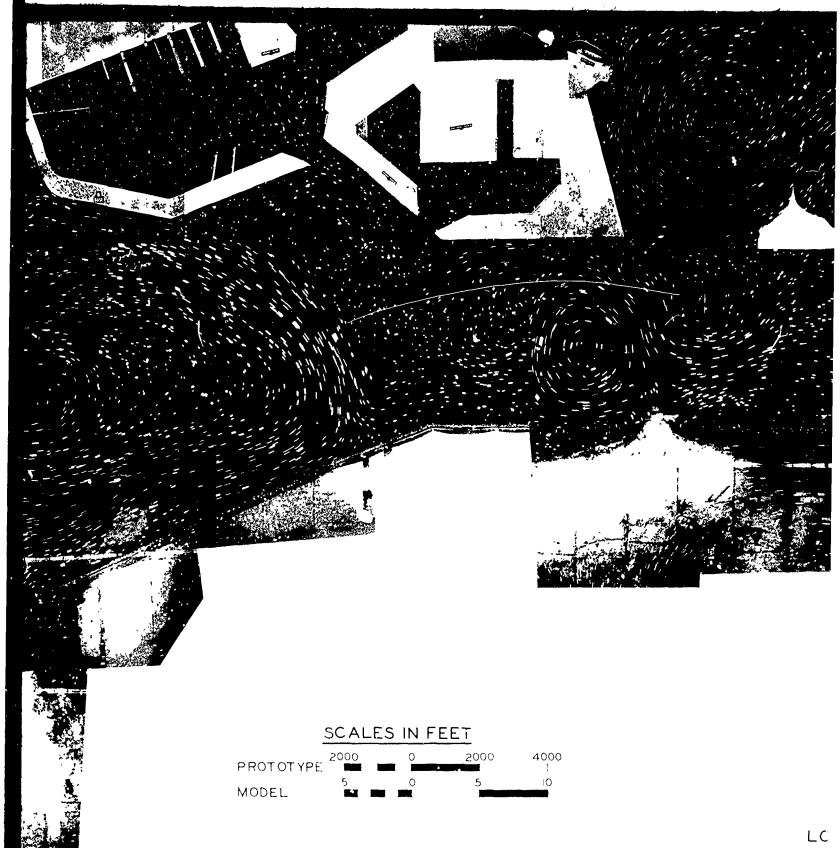




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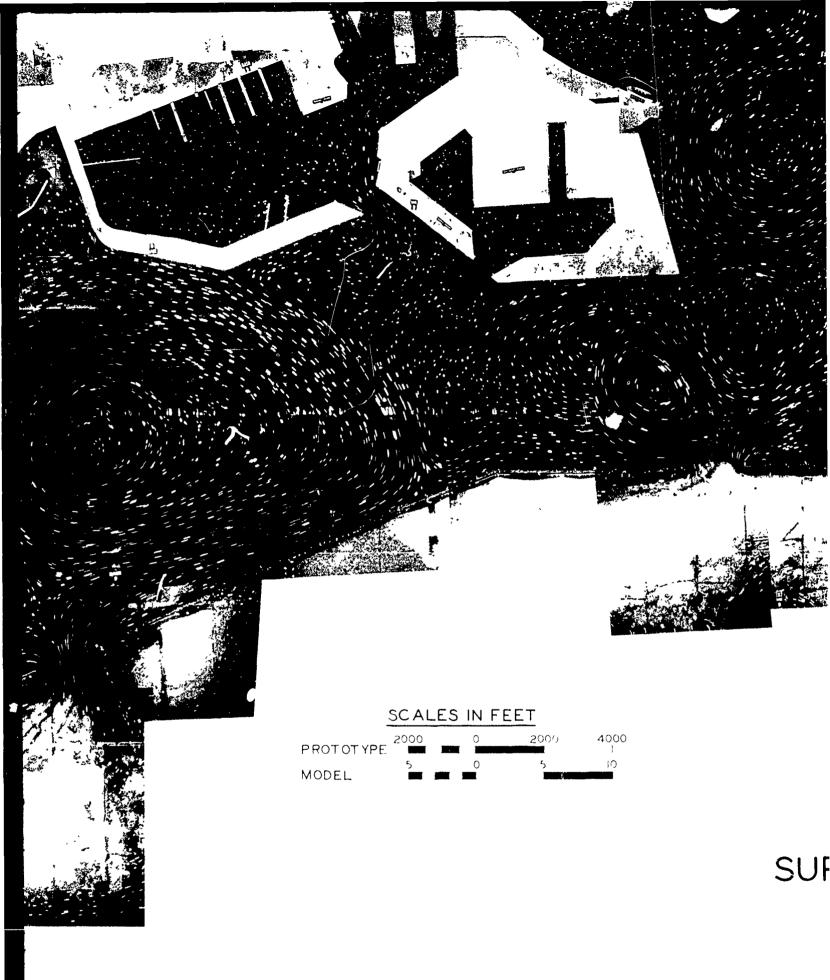
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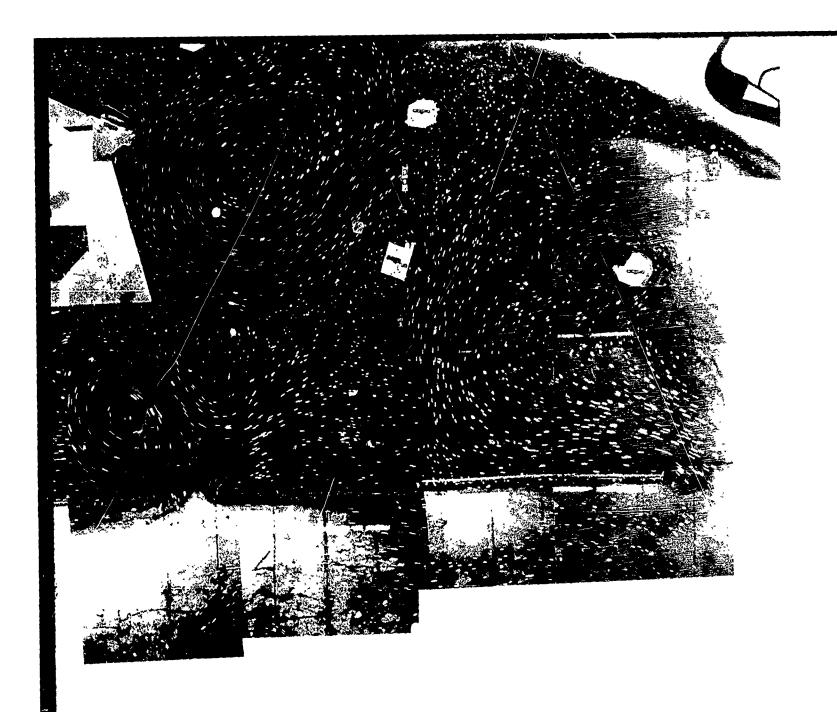












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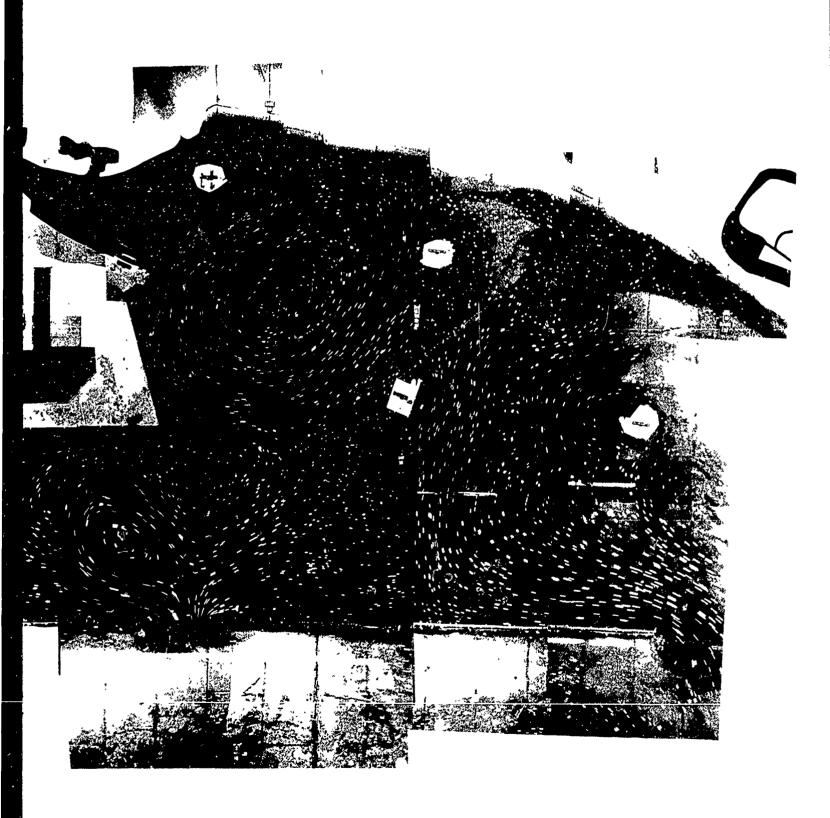
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SURFACE CURRENT PATTERNS

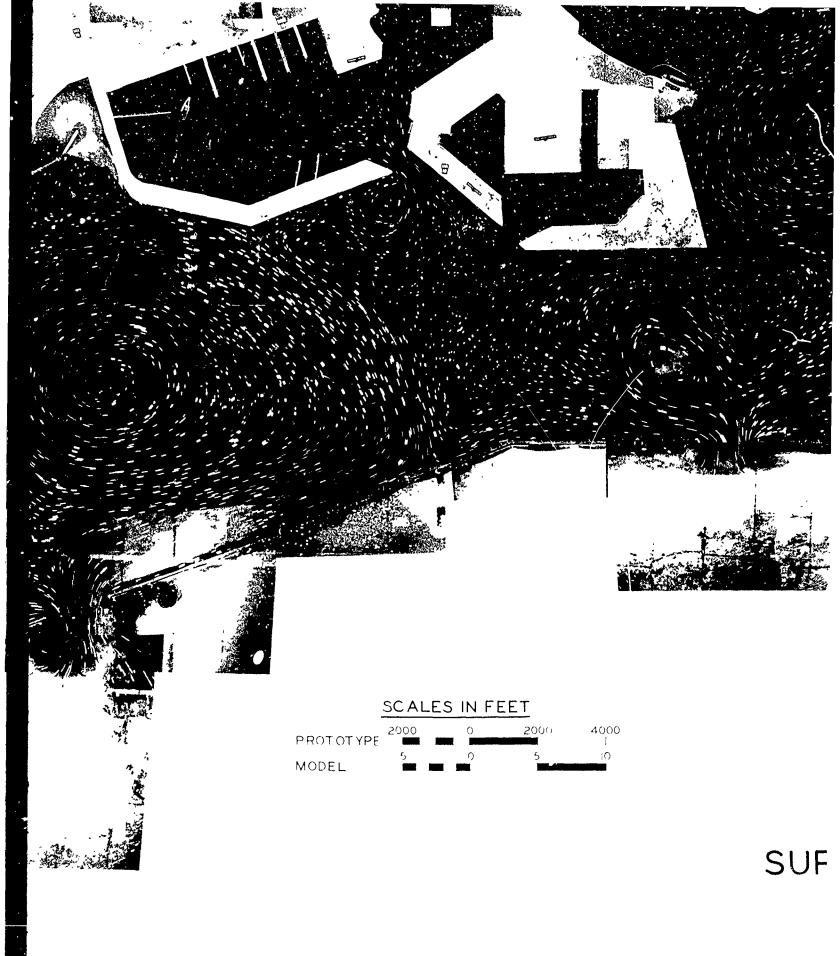


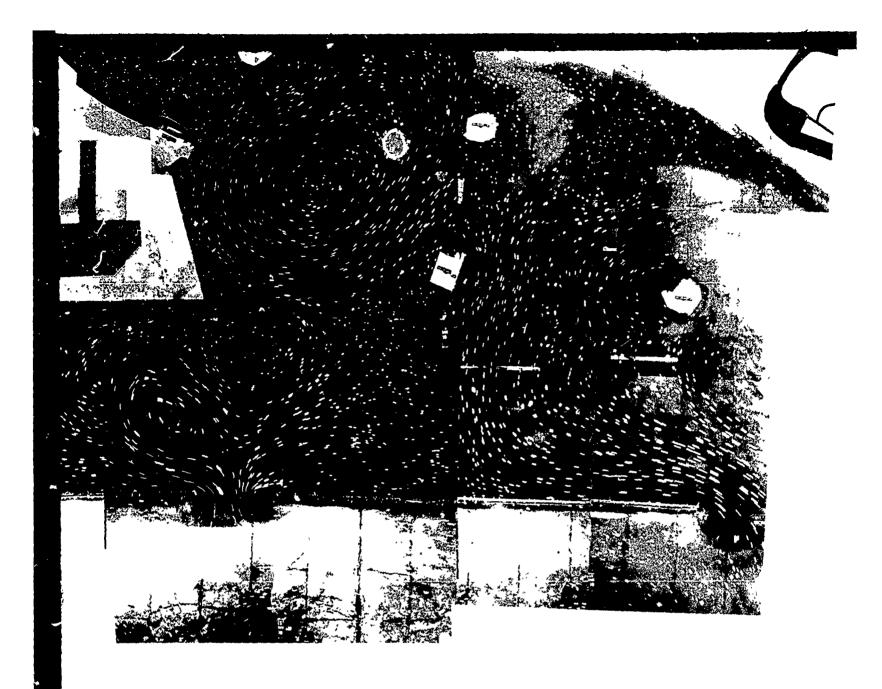
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

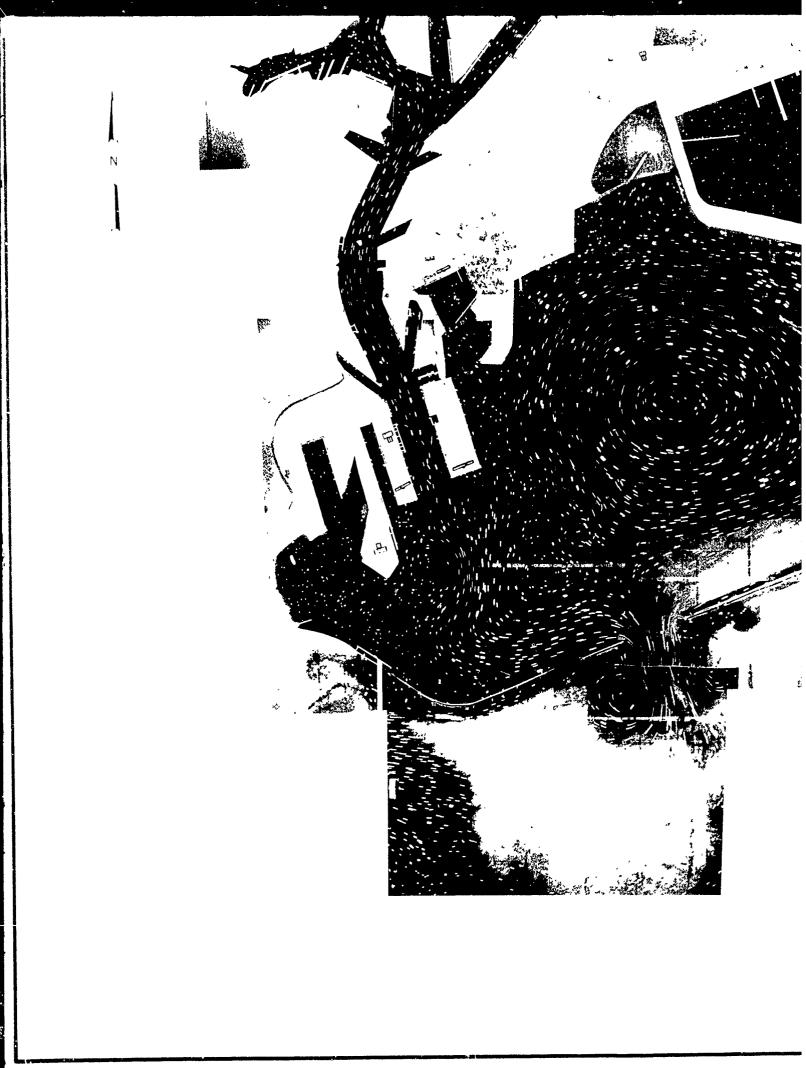
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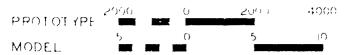


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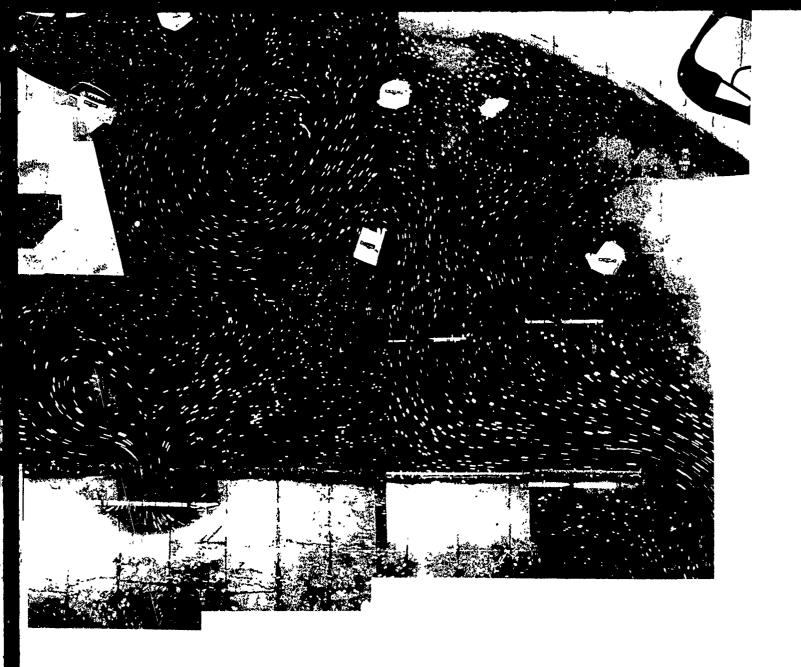
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VELOCITY SCALE

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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST SPRING TIDE HOUR !!

PLATE B12







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VELOCITY SCALE

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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS













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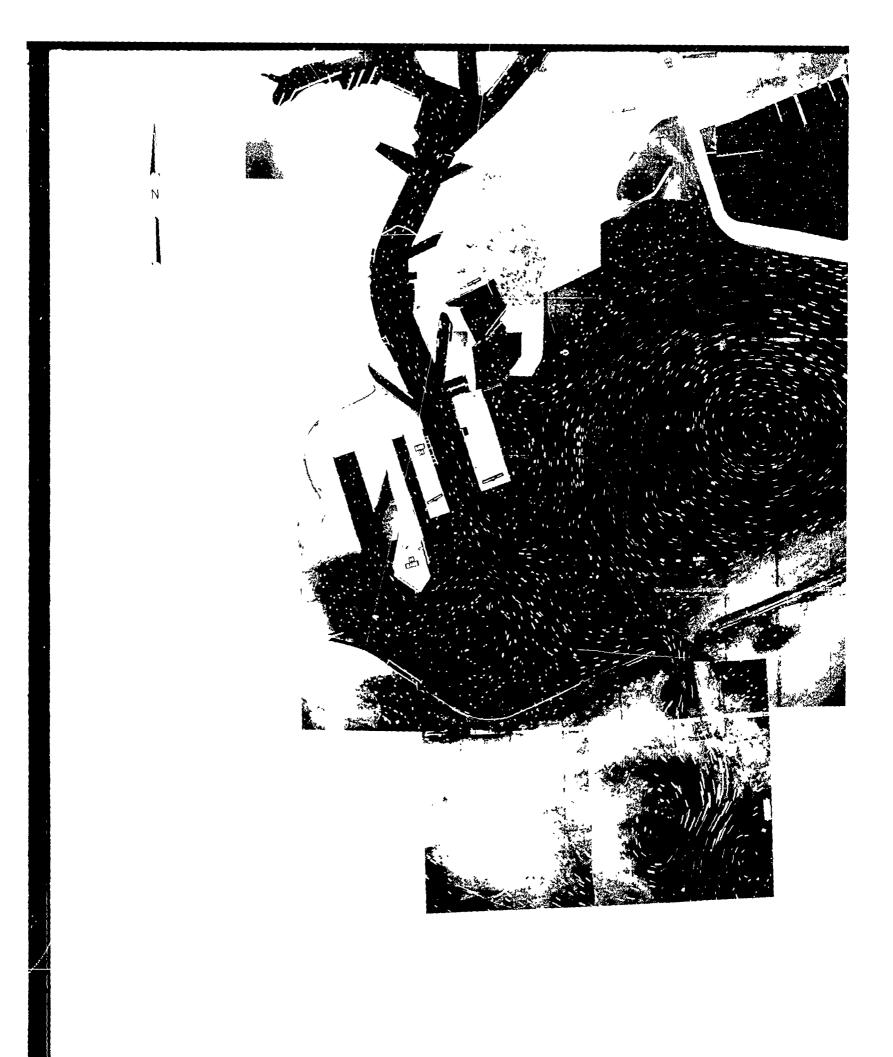
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

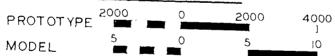












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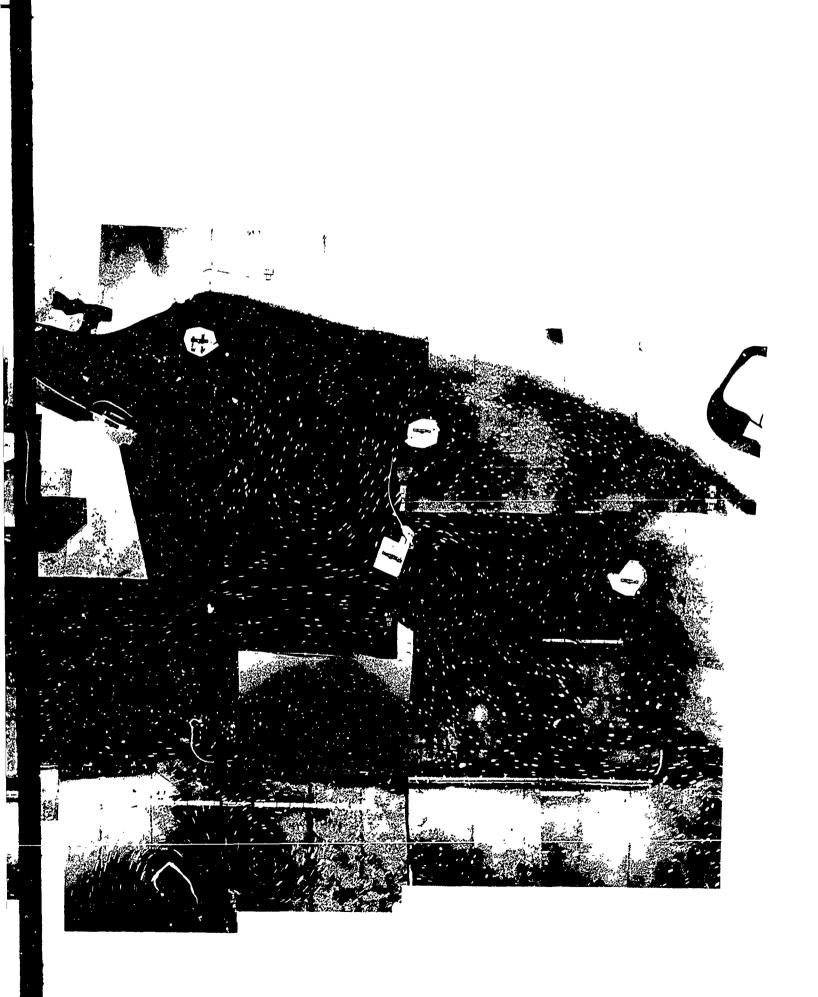
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SURFACE CURRENT PATTERNS



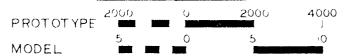
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

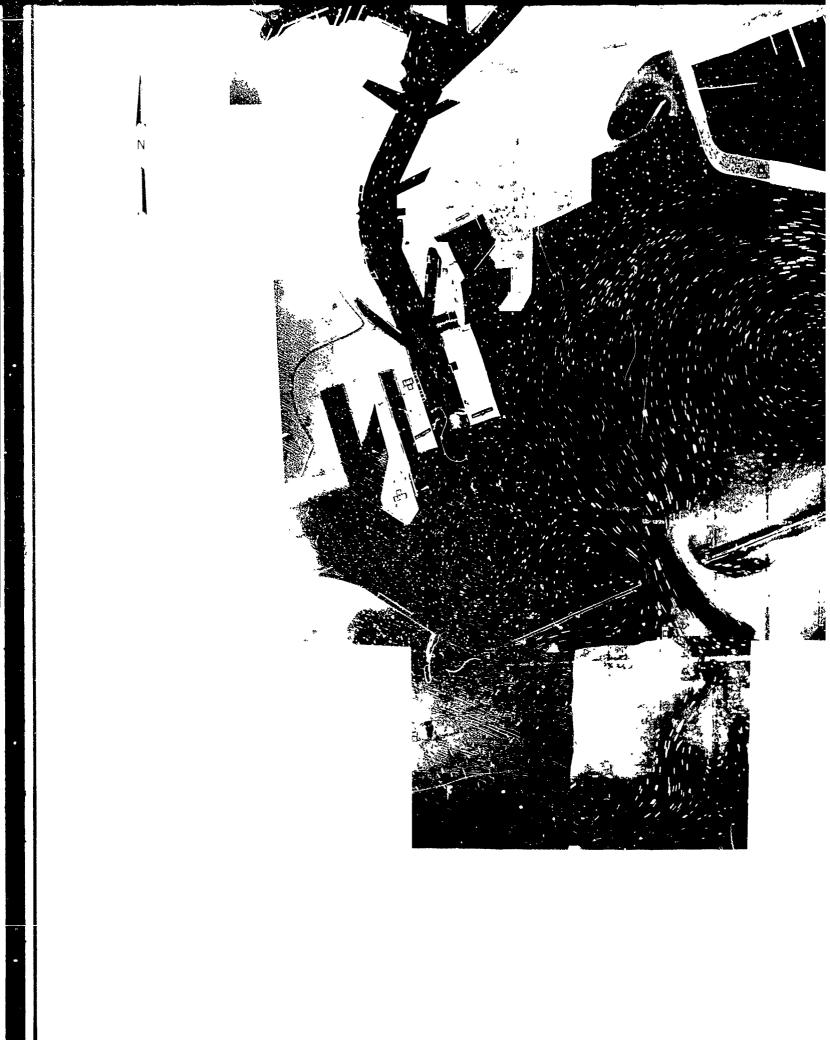
SURFACE CURRENT PATTERNS

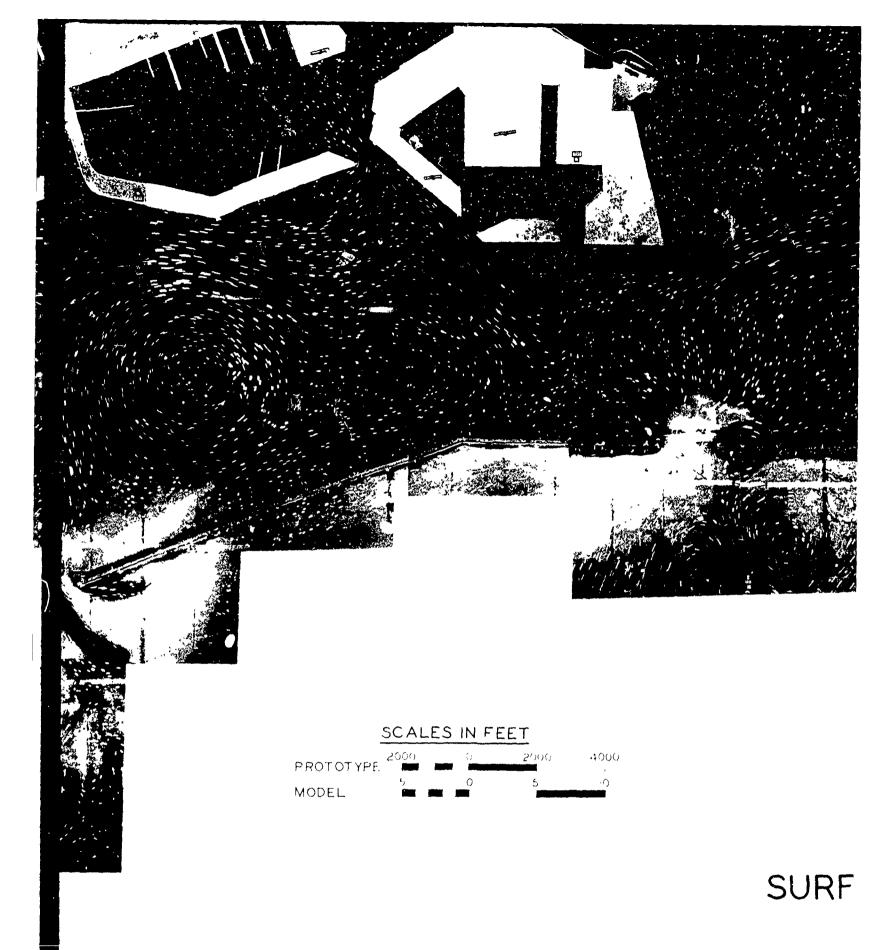


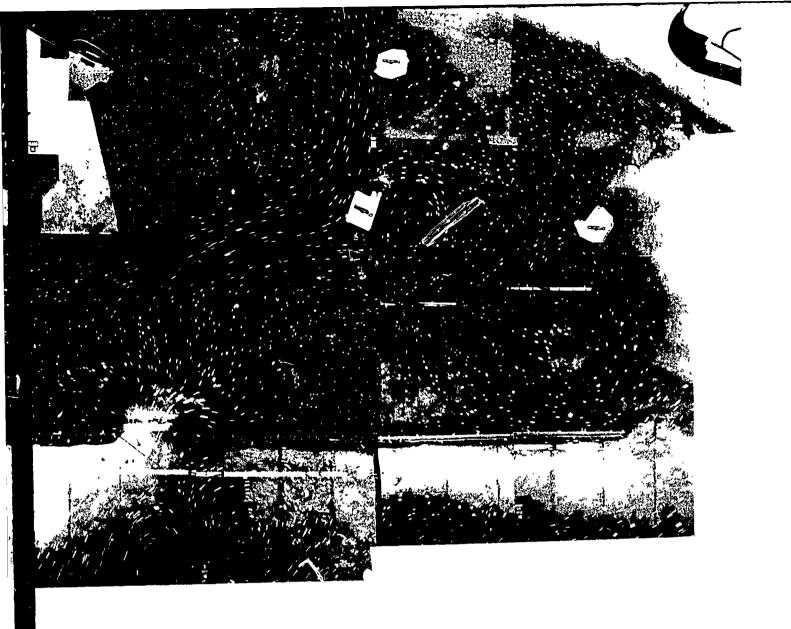
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS



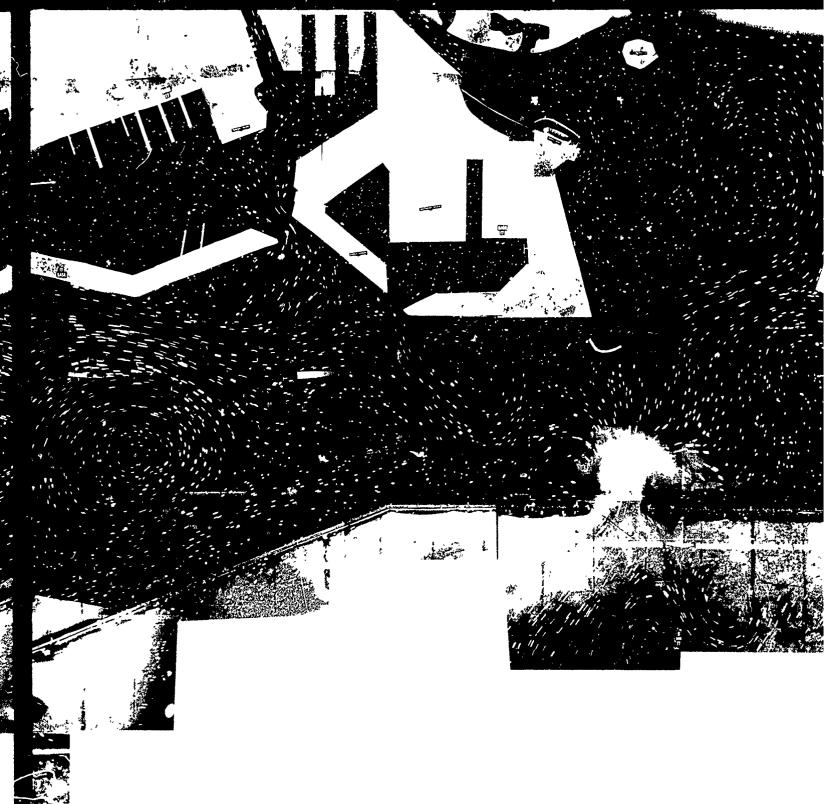
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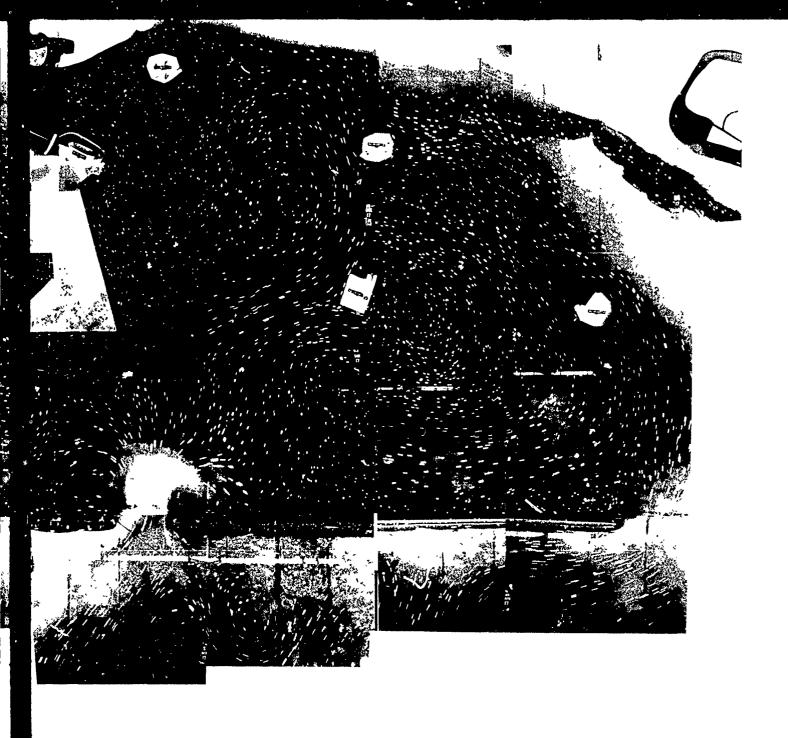


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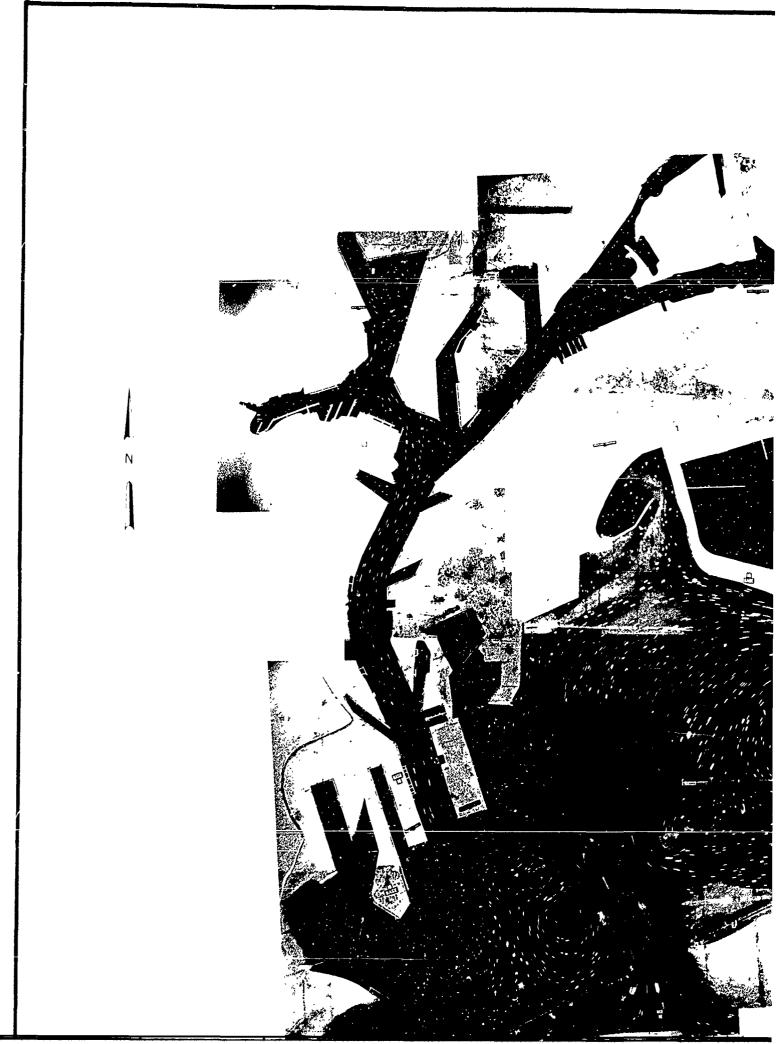
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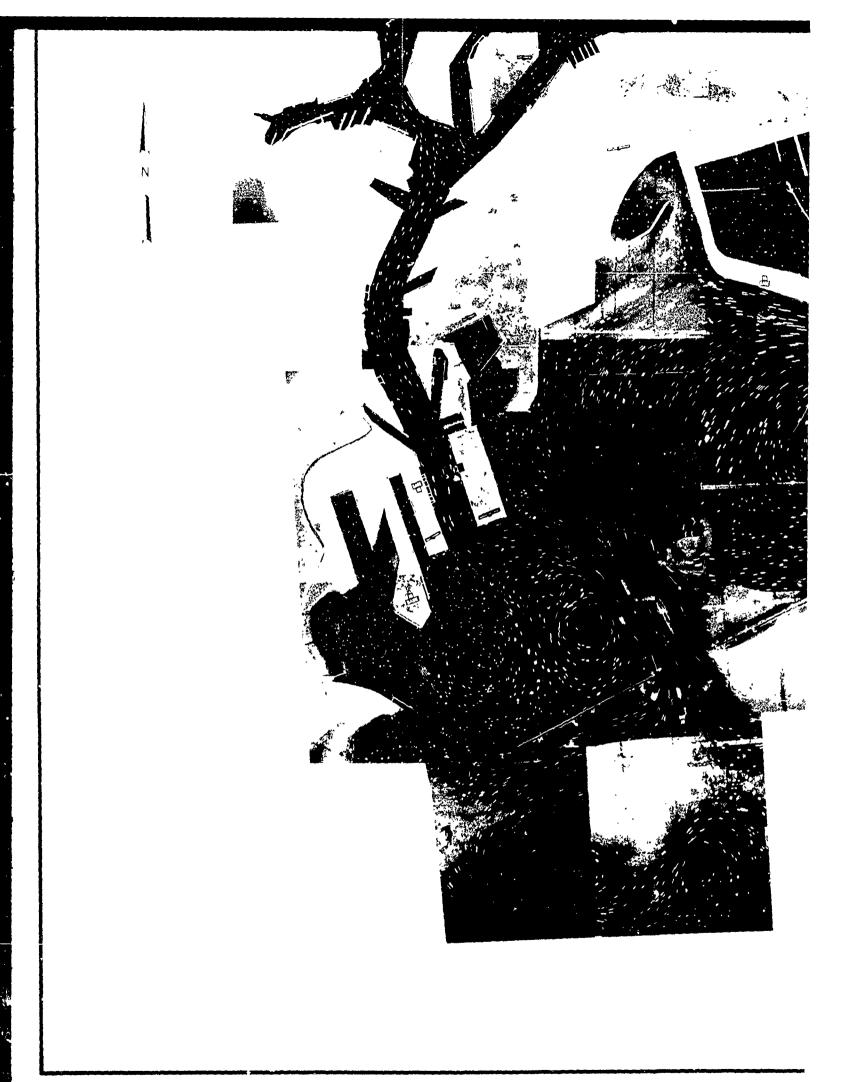
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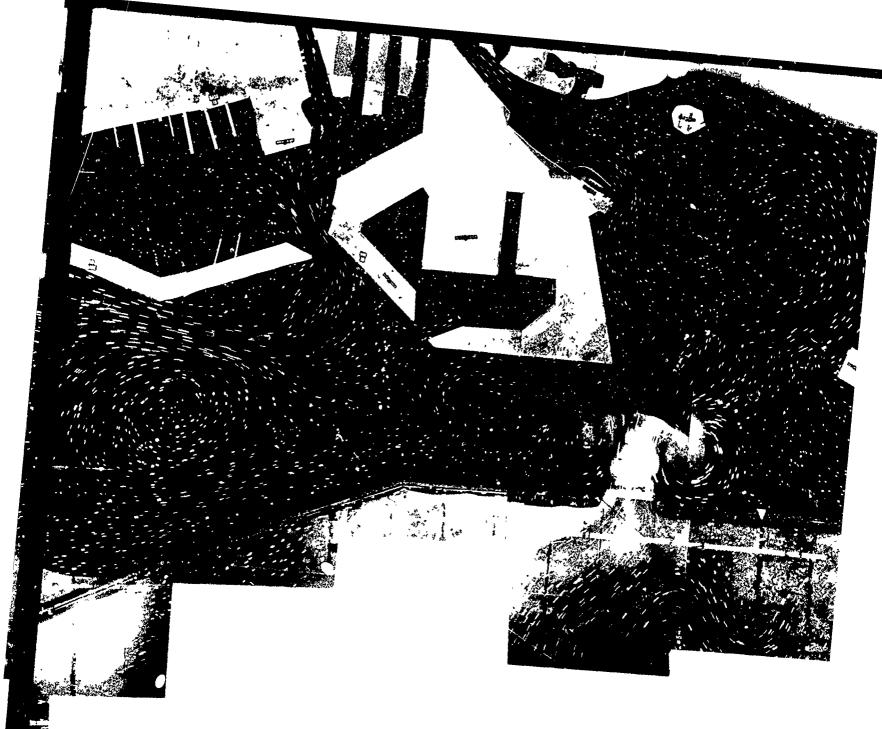
SURFACE CURRENT PATTERNS

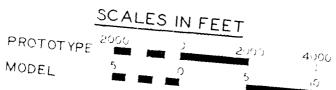












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VELOCITY SCALE

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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS



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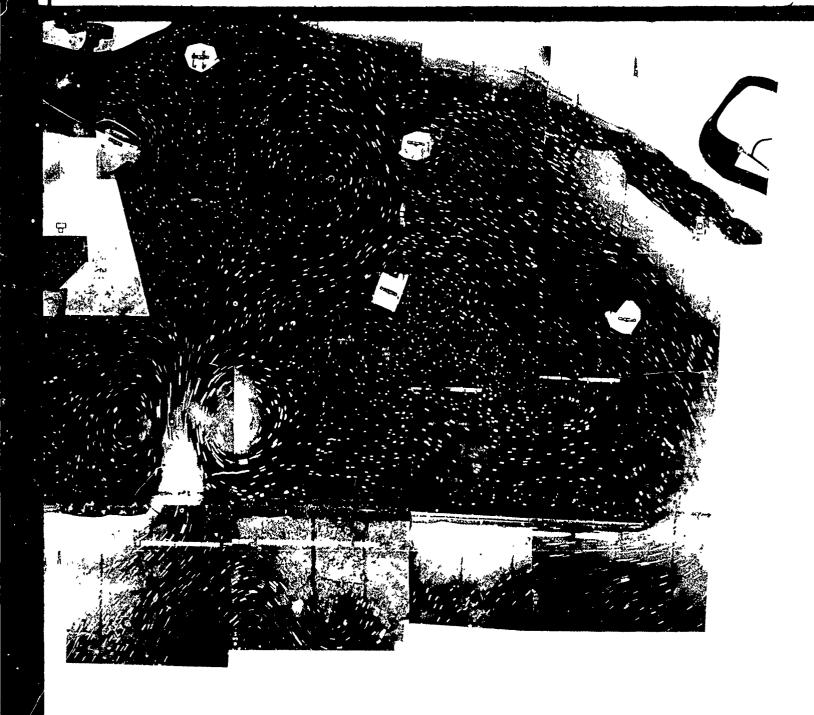
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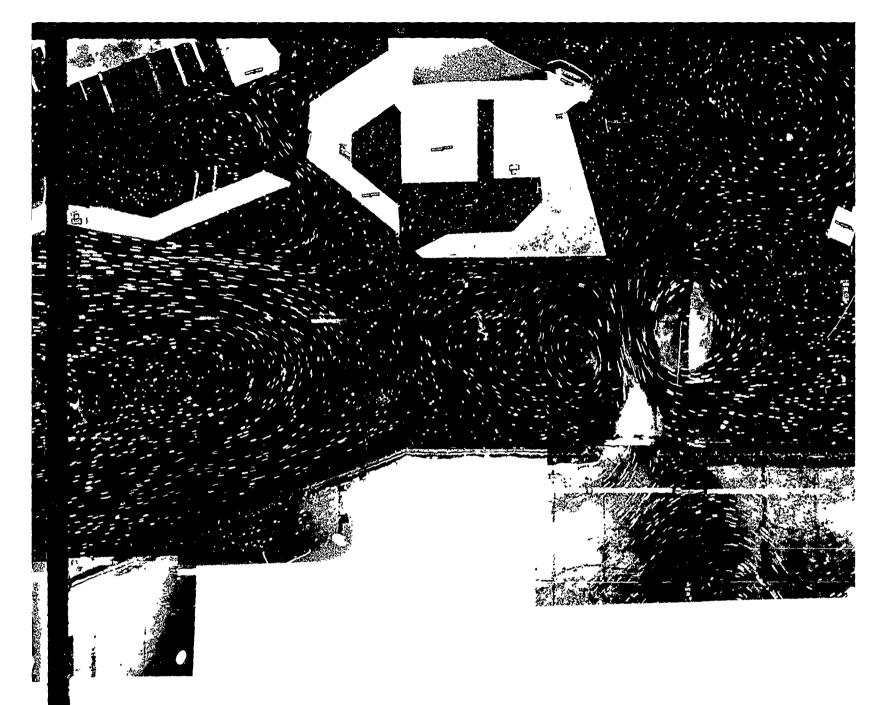
SURFACE CURRENT PATTERNS



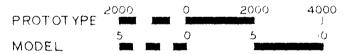






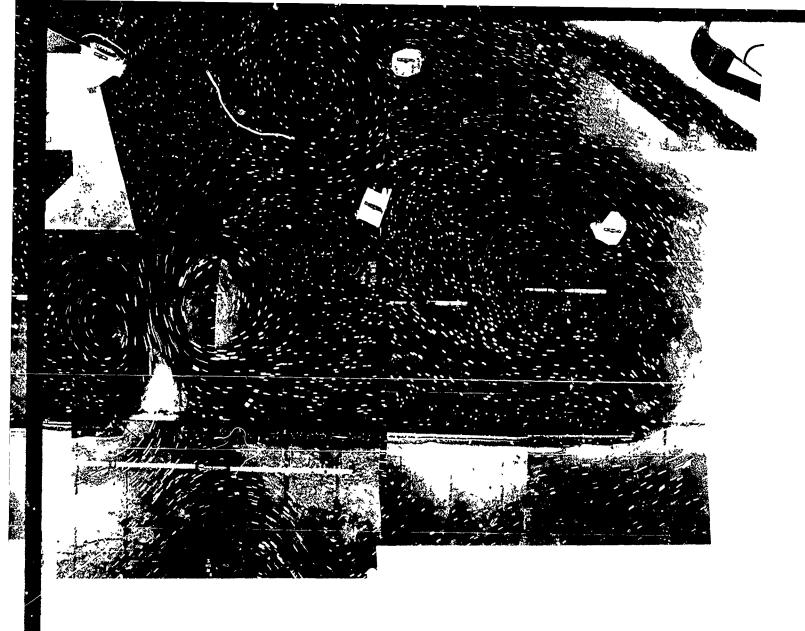


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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

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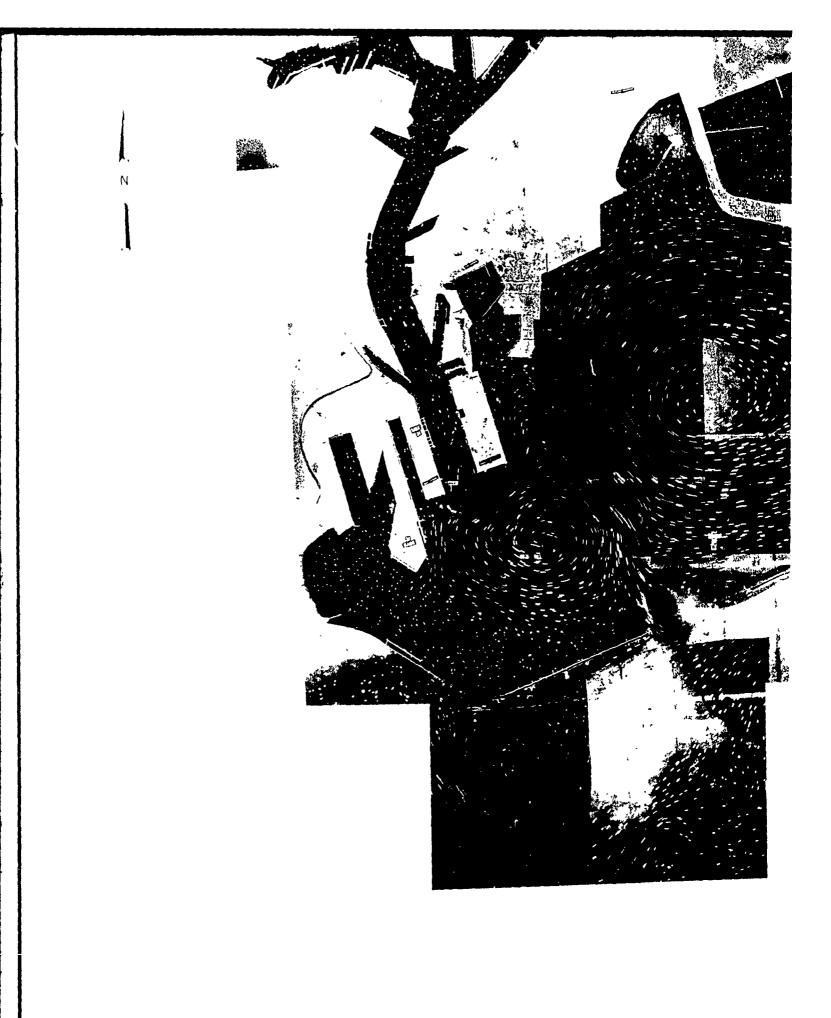
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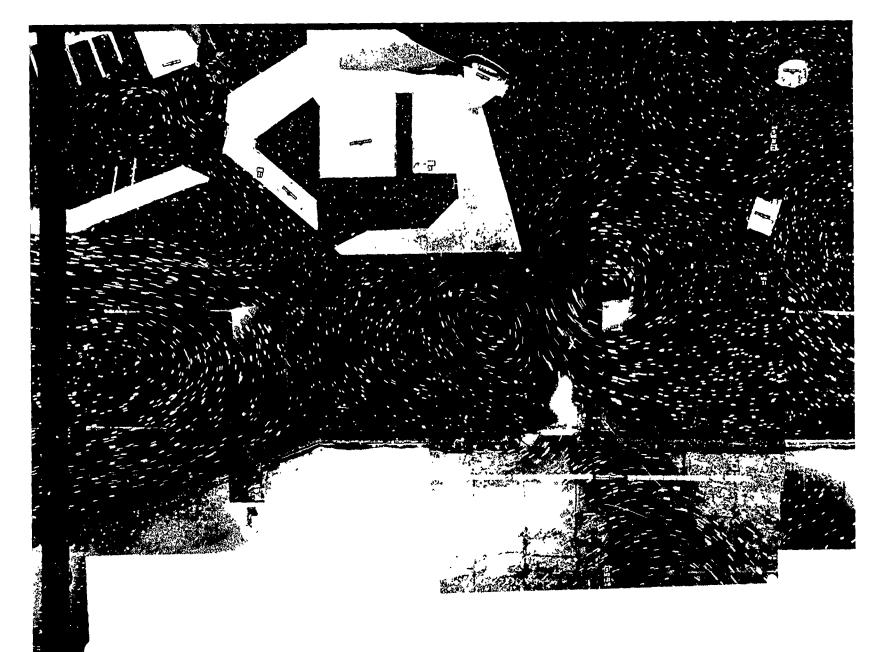
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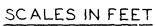


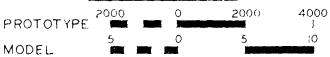




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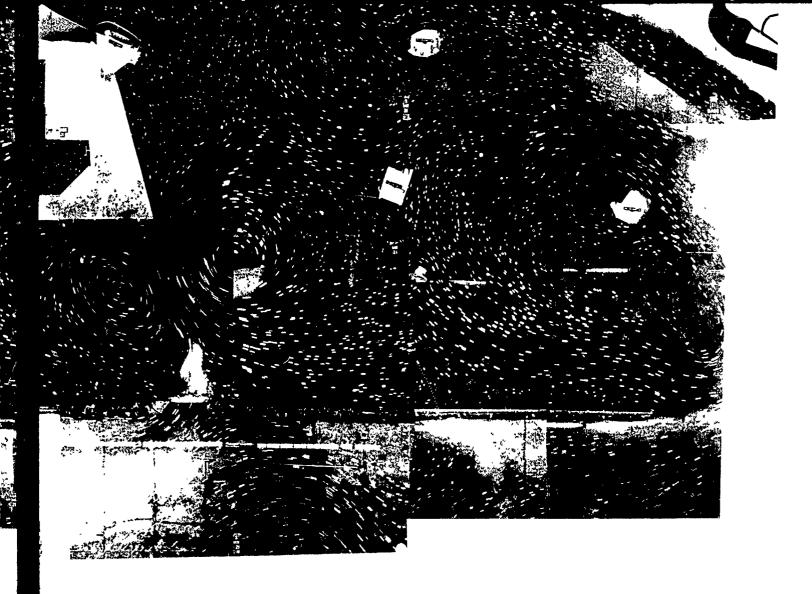
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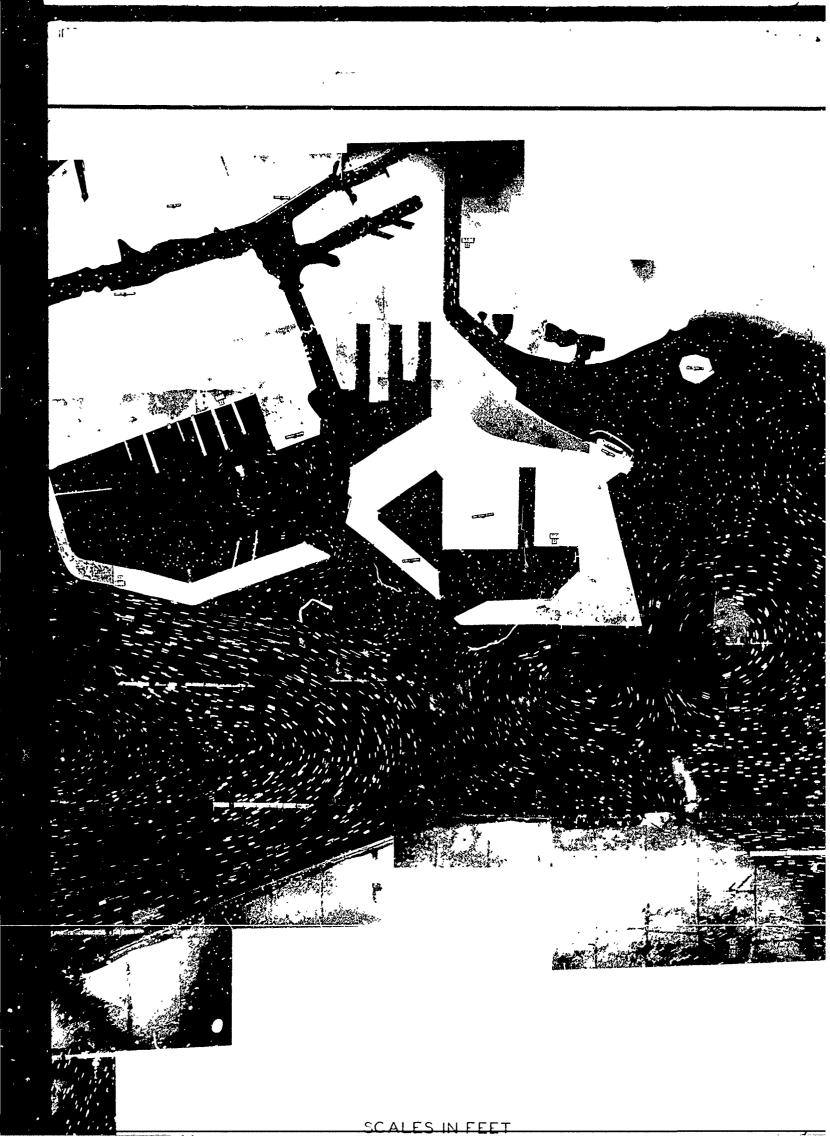
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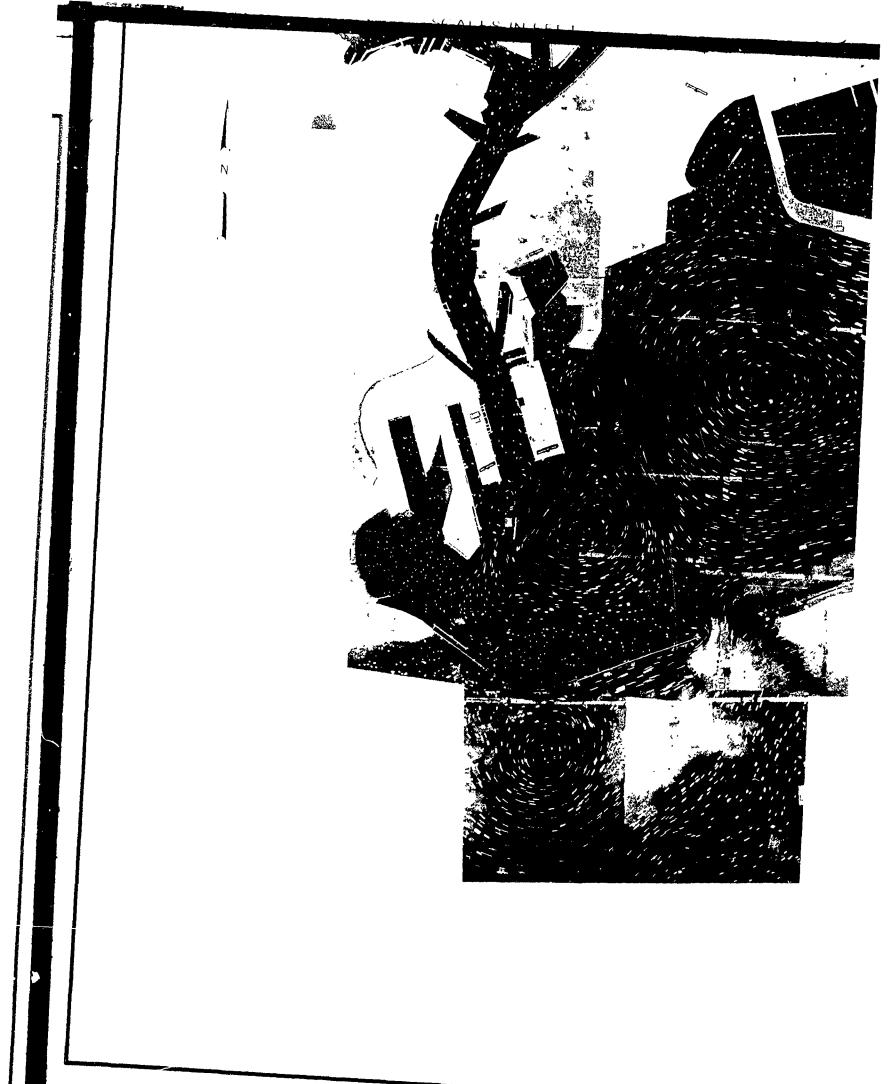
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS



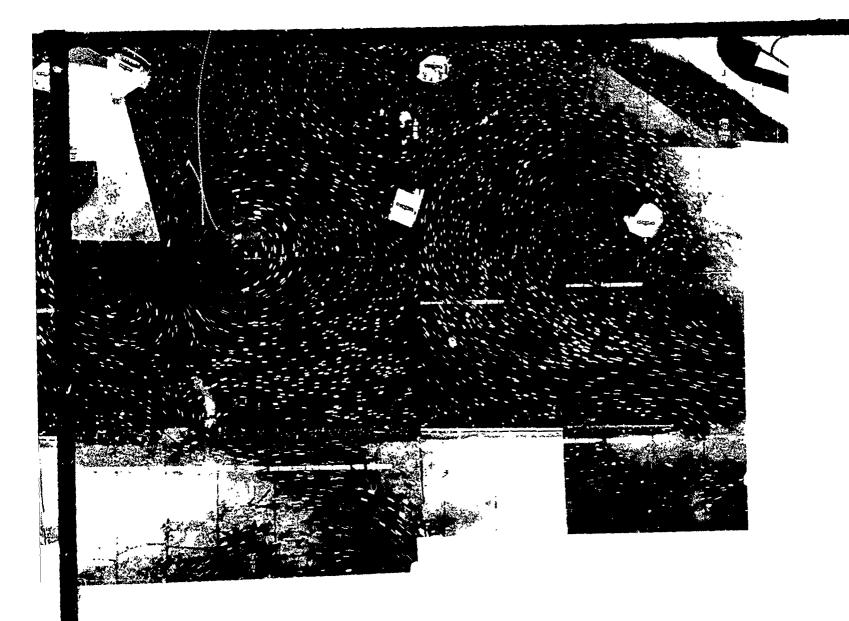








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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST SPRING TIDE HOUR 22

PLATE B



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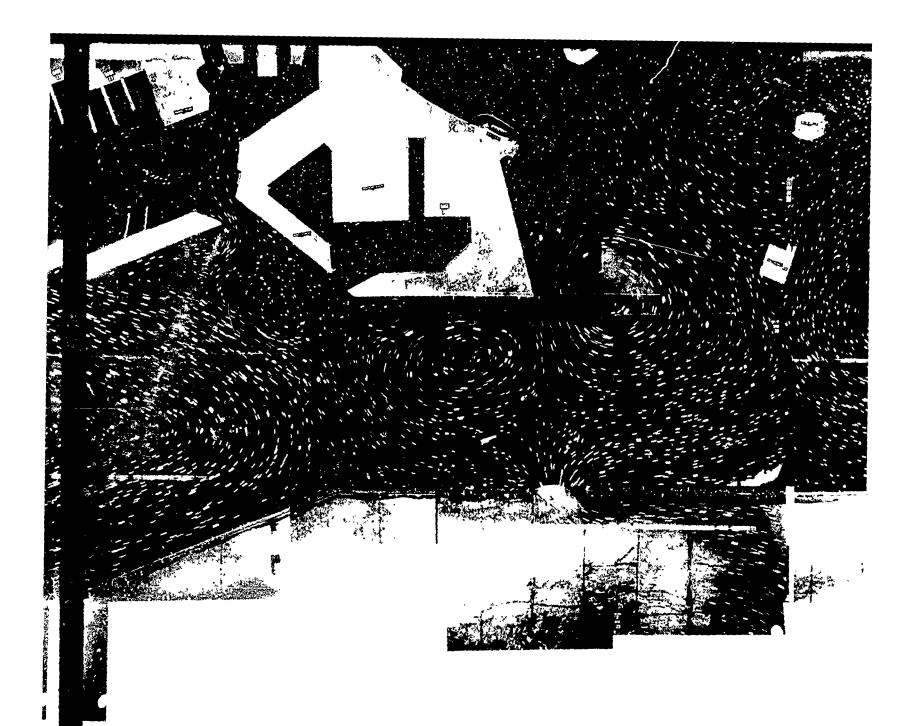
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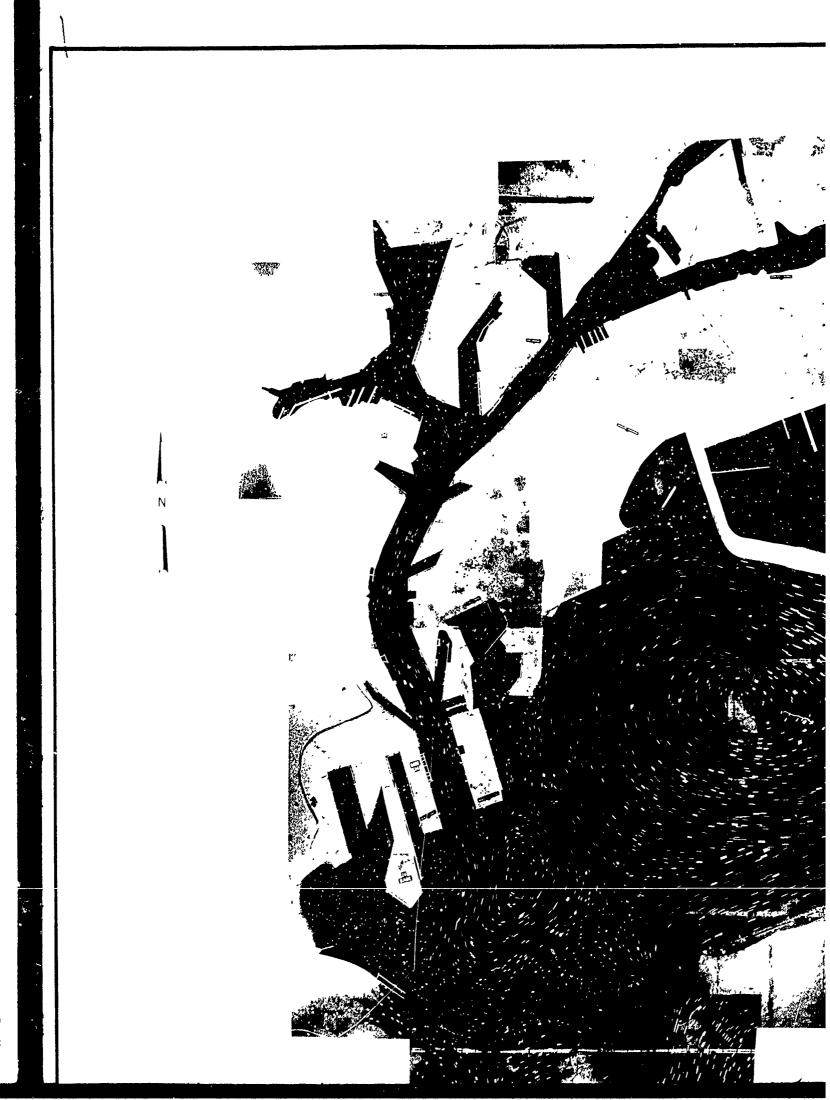
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST SPRING TIDE HOUR 23





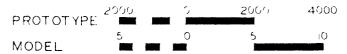




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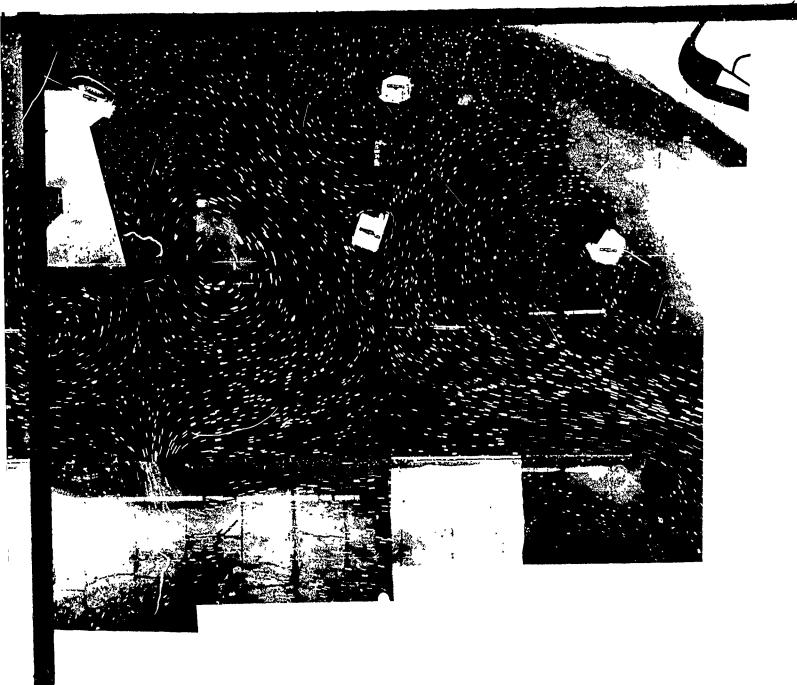


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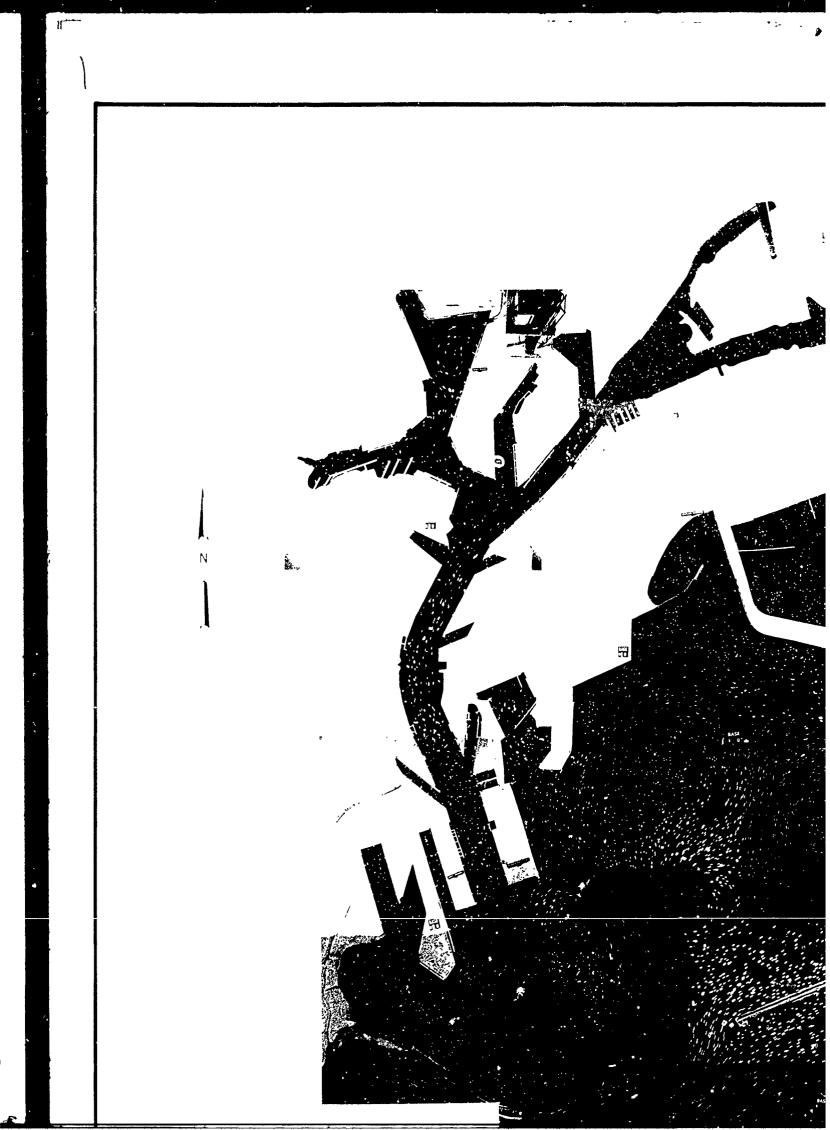
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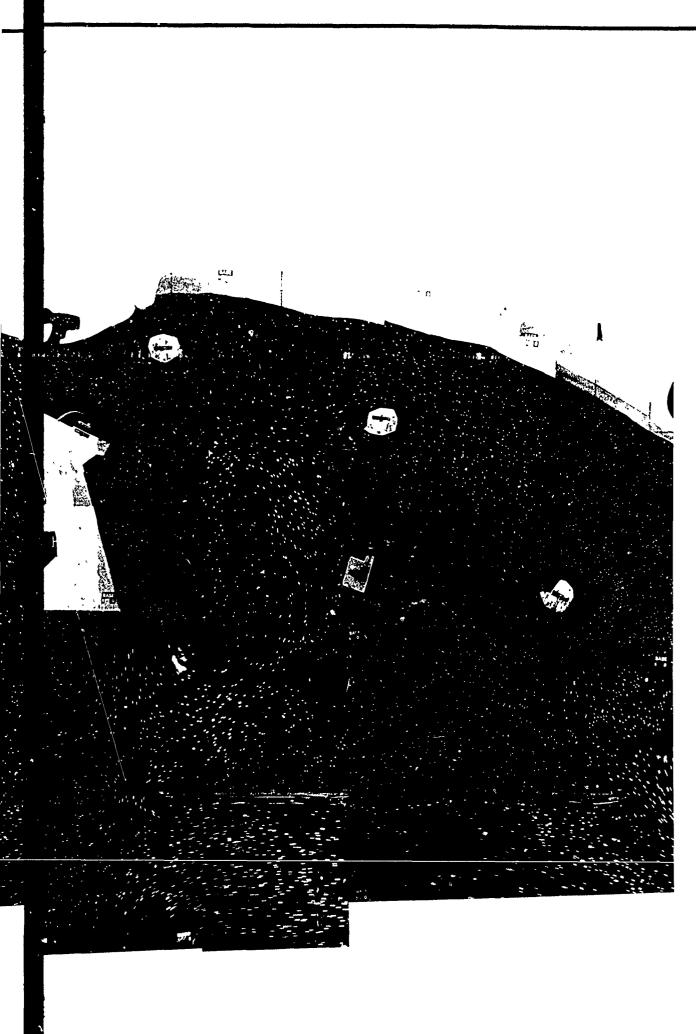
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST SPRING TIDE HOUR 24

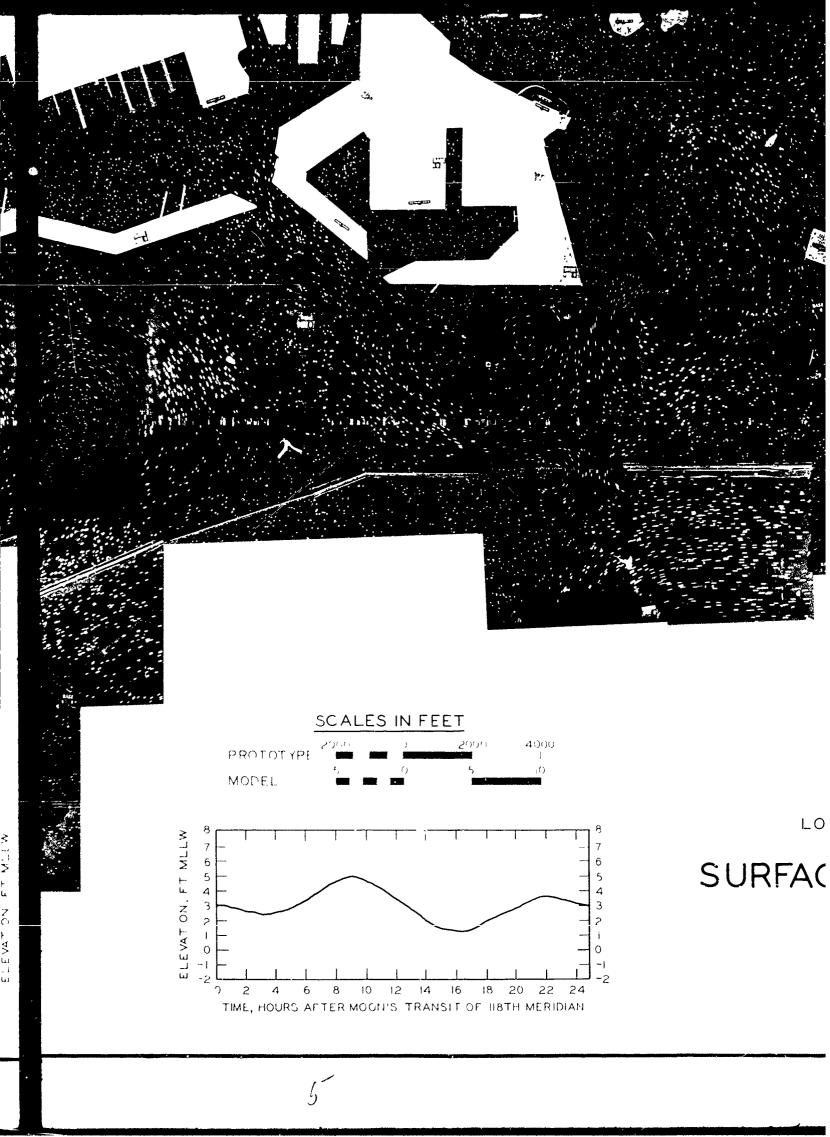


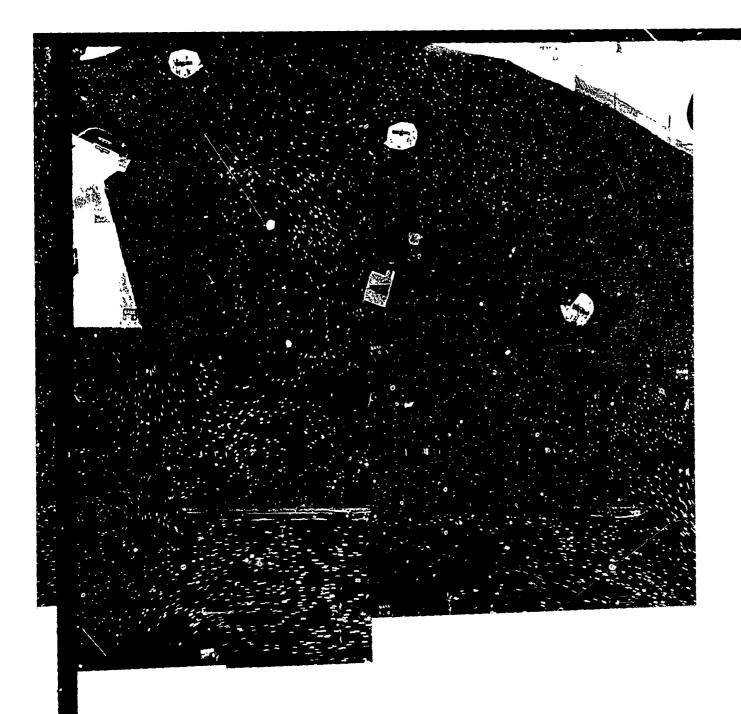




VELOCITY SCALE







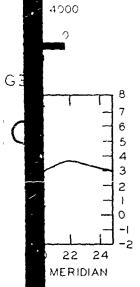
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

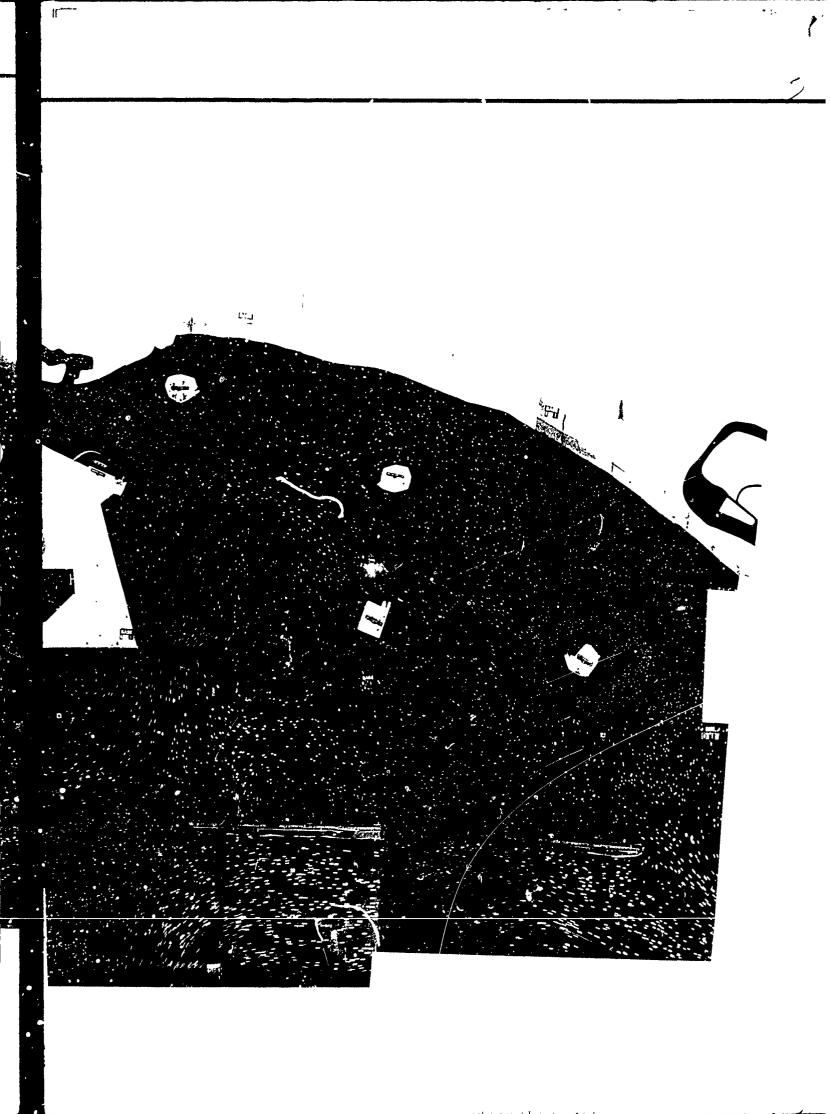
SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE HOUR O

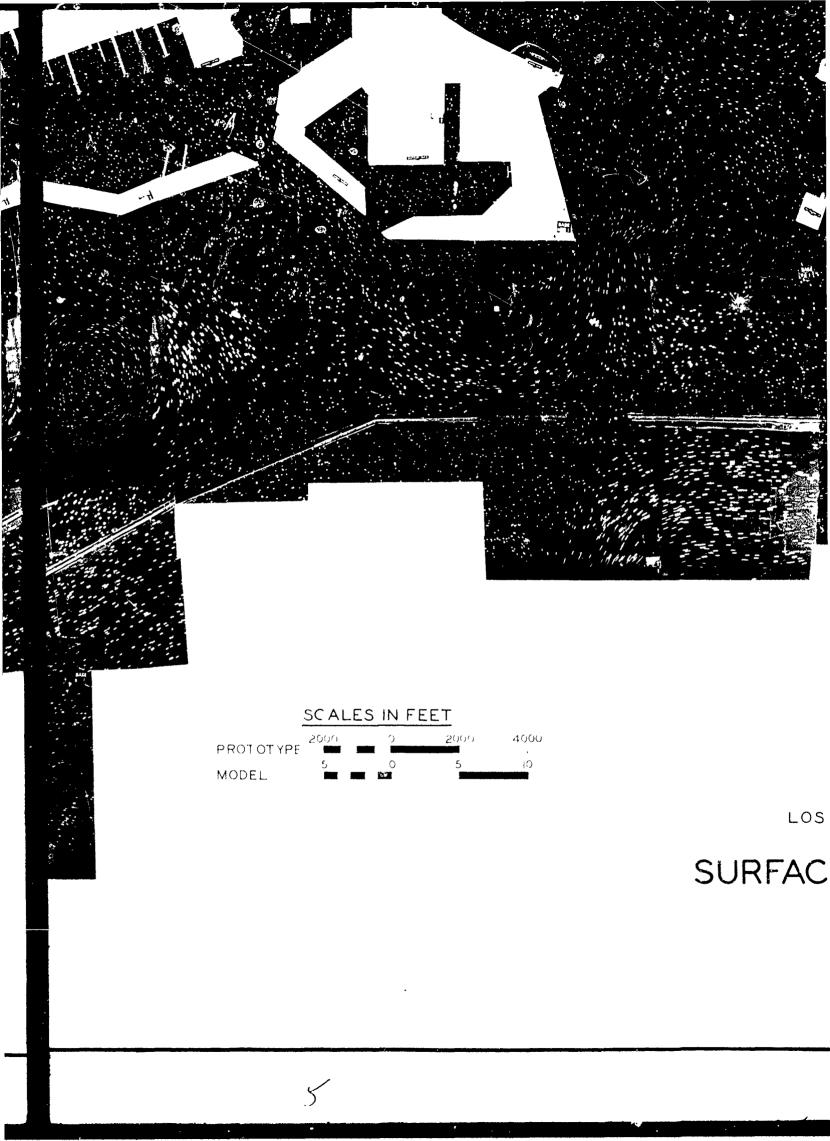














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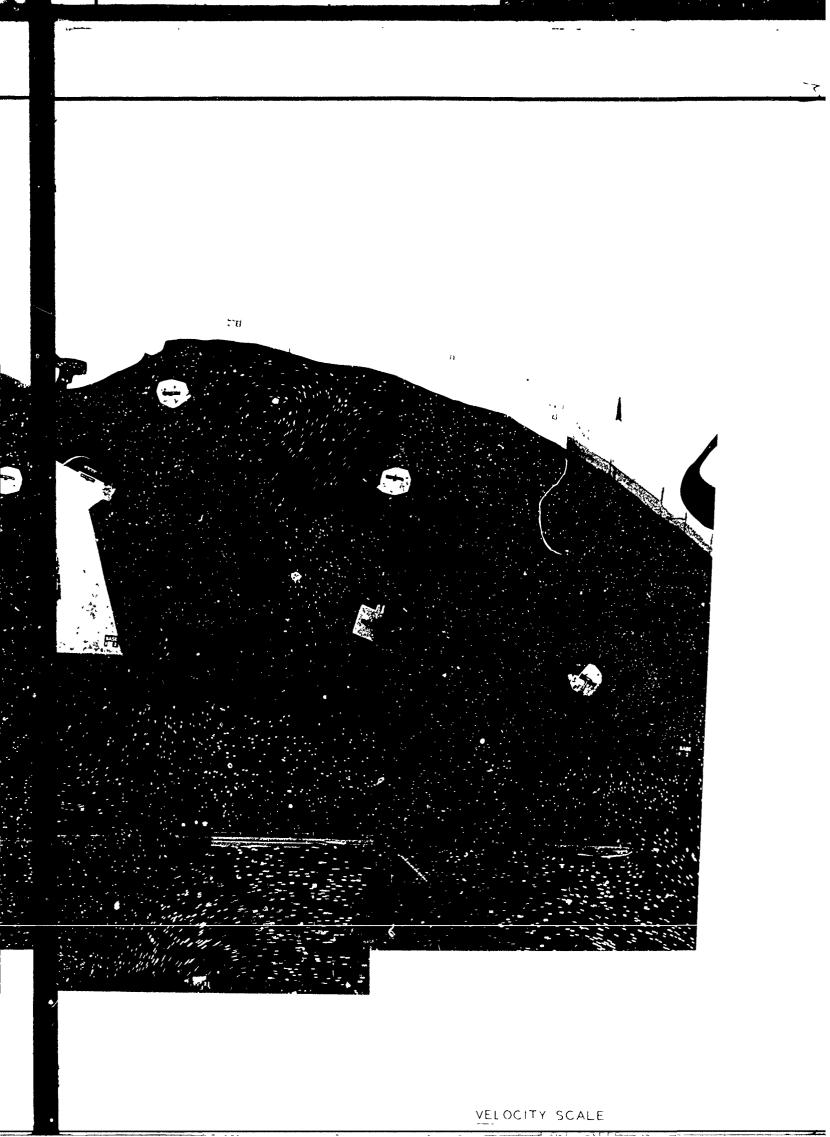
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

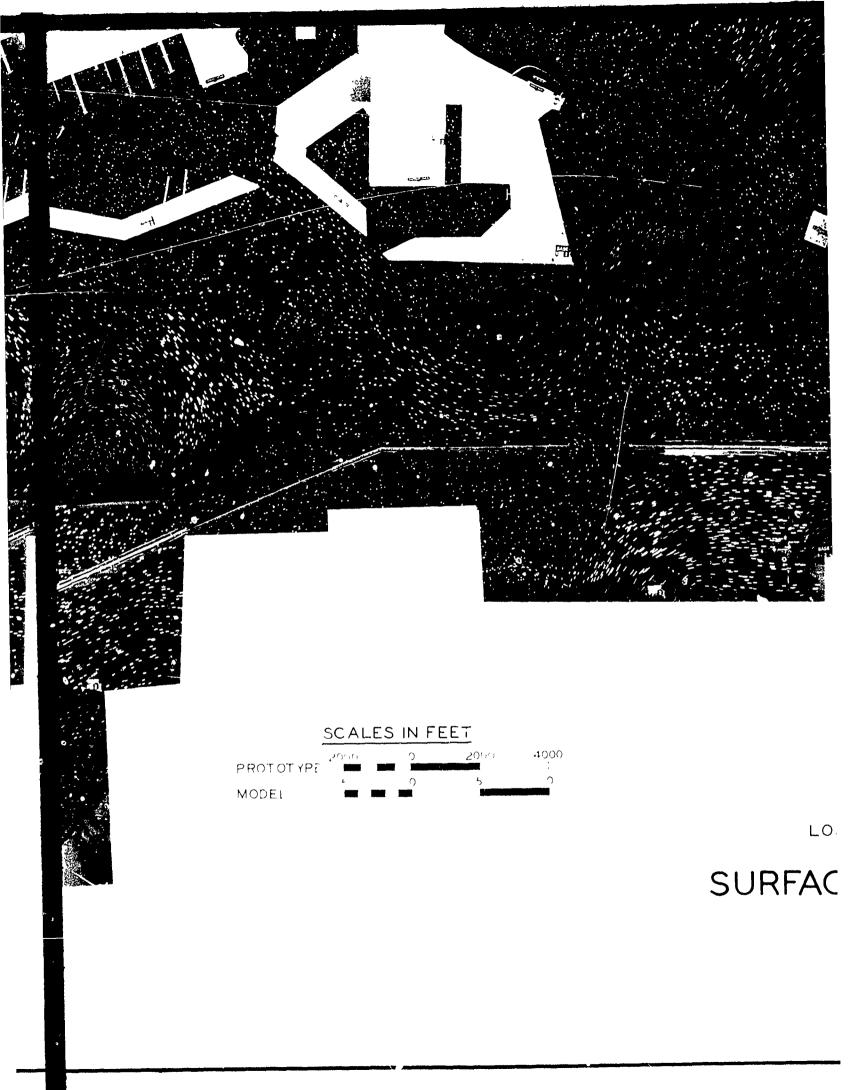
BASE TEST NEAP TIDE HOUR I

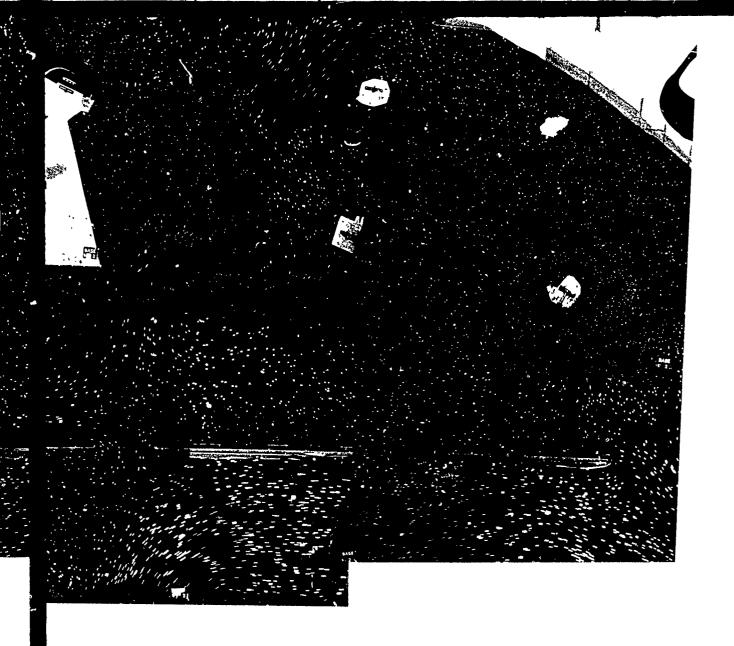












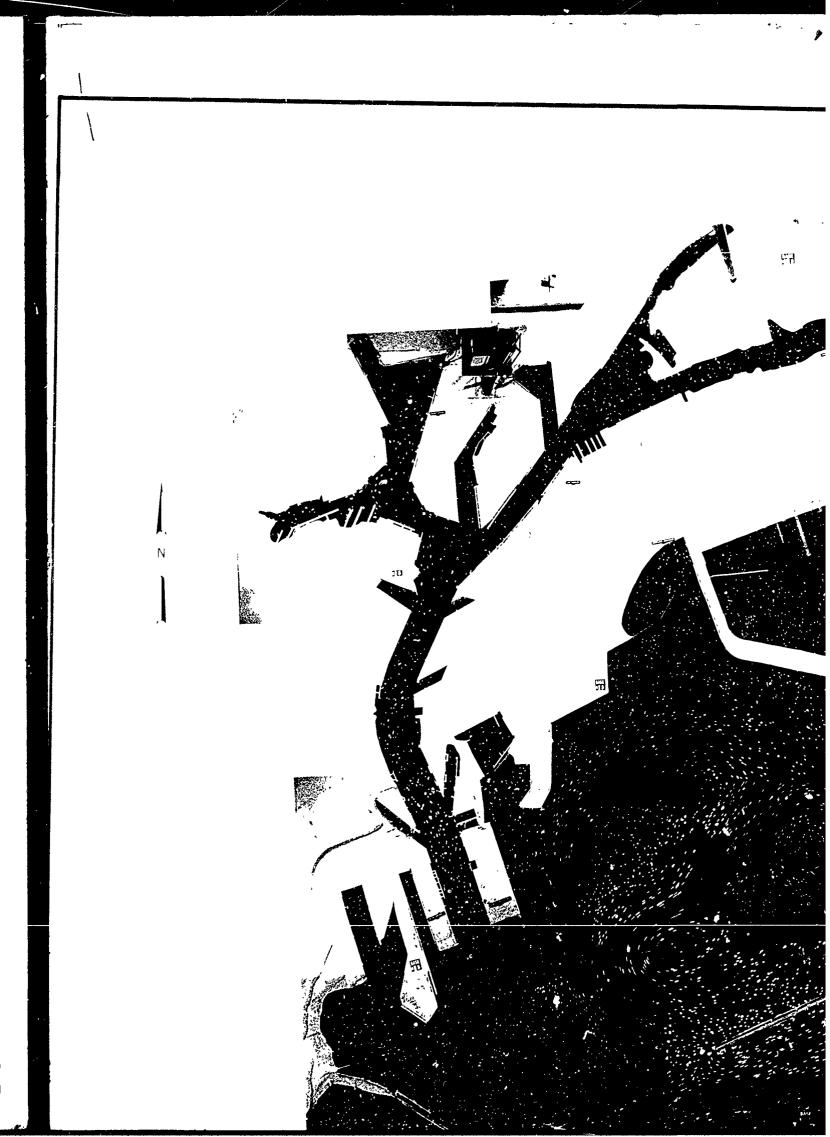
VELOCITY SCALE

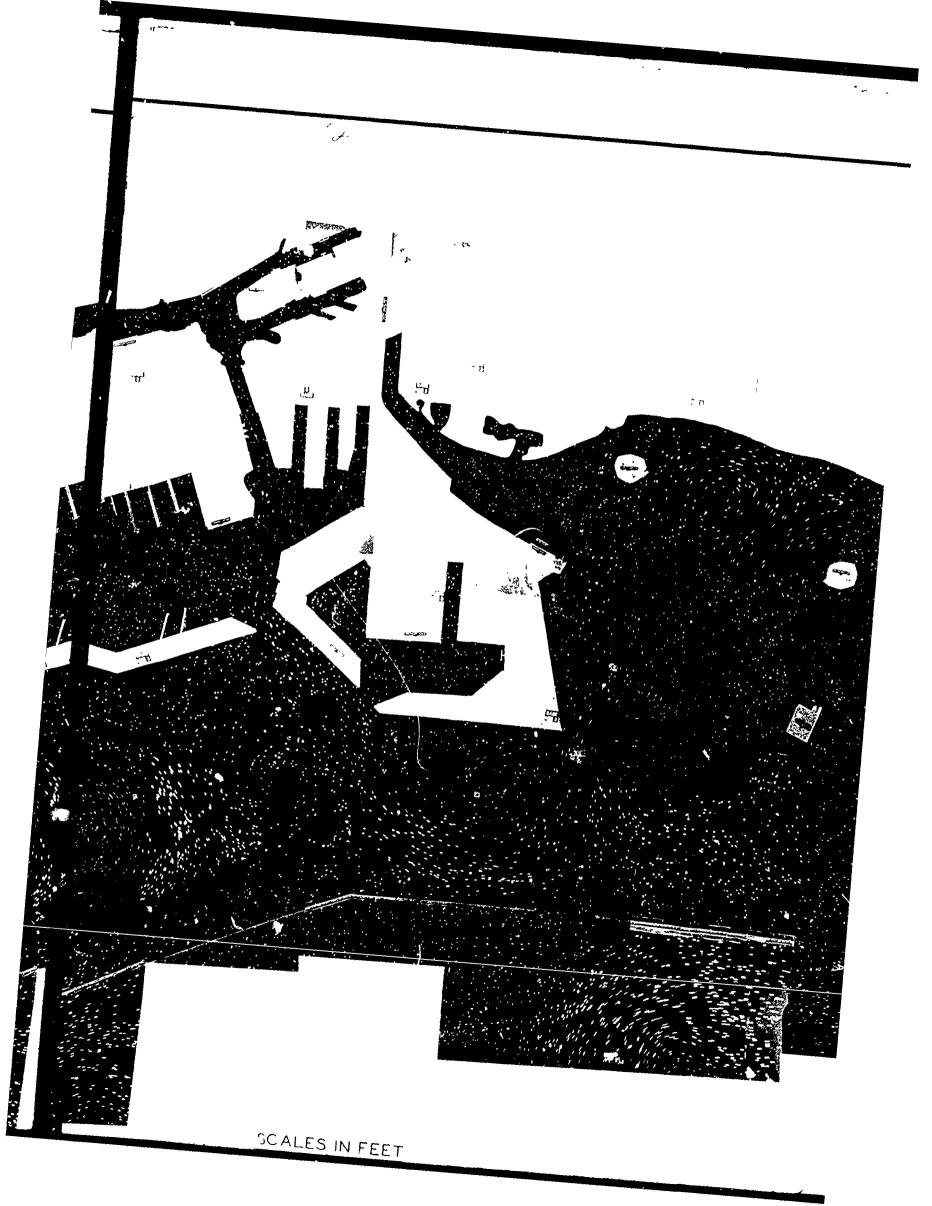
PROTOTYPE | 0 | 2 3 EPS

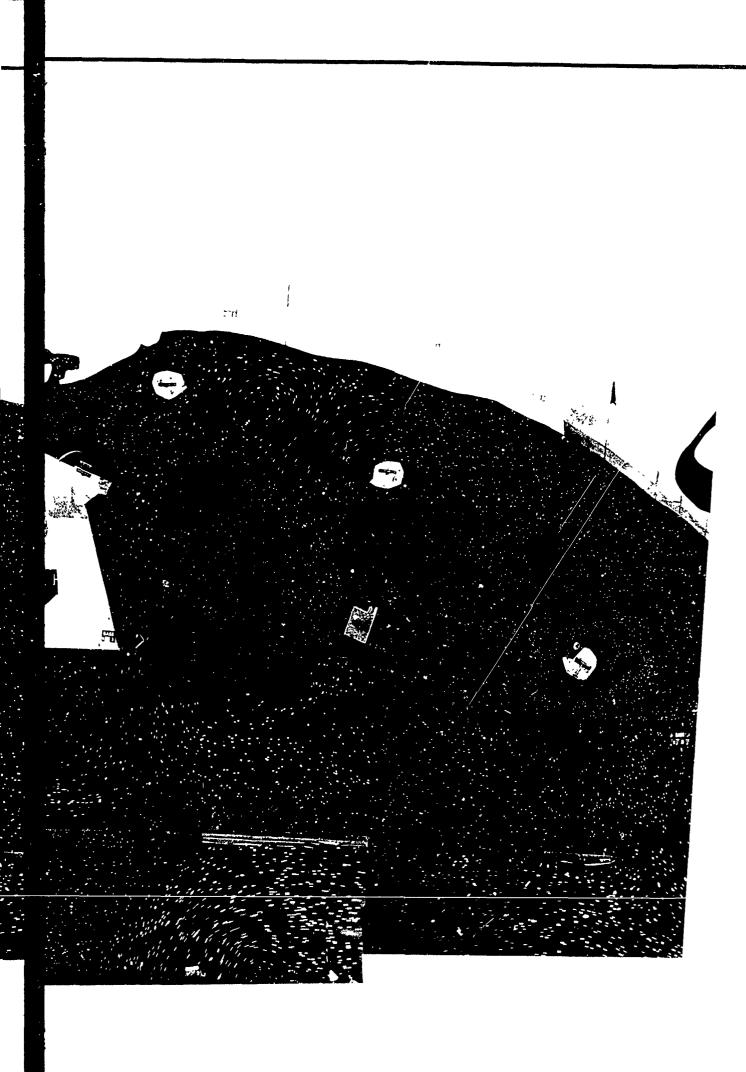
MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE HOUR 2





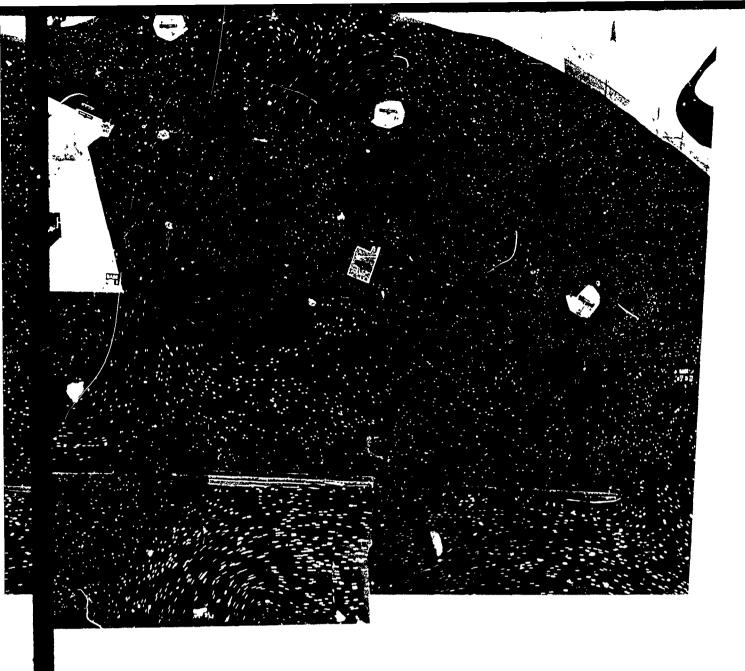






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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

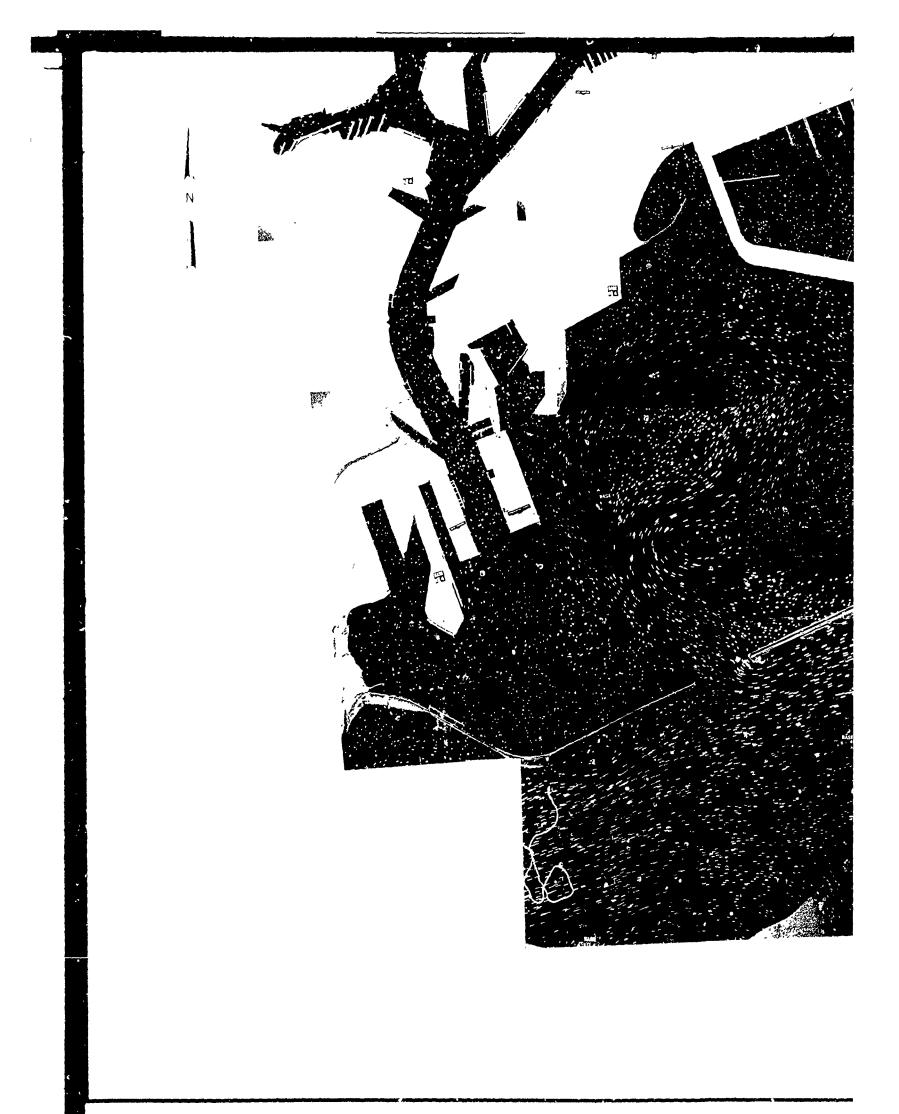
SURFACE CURRENT PATTERNS

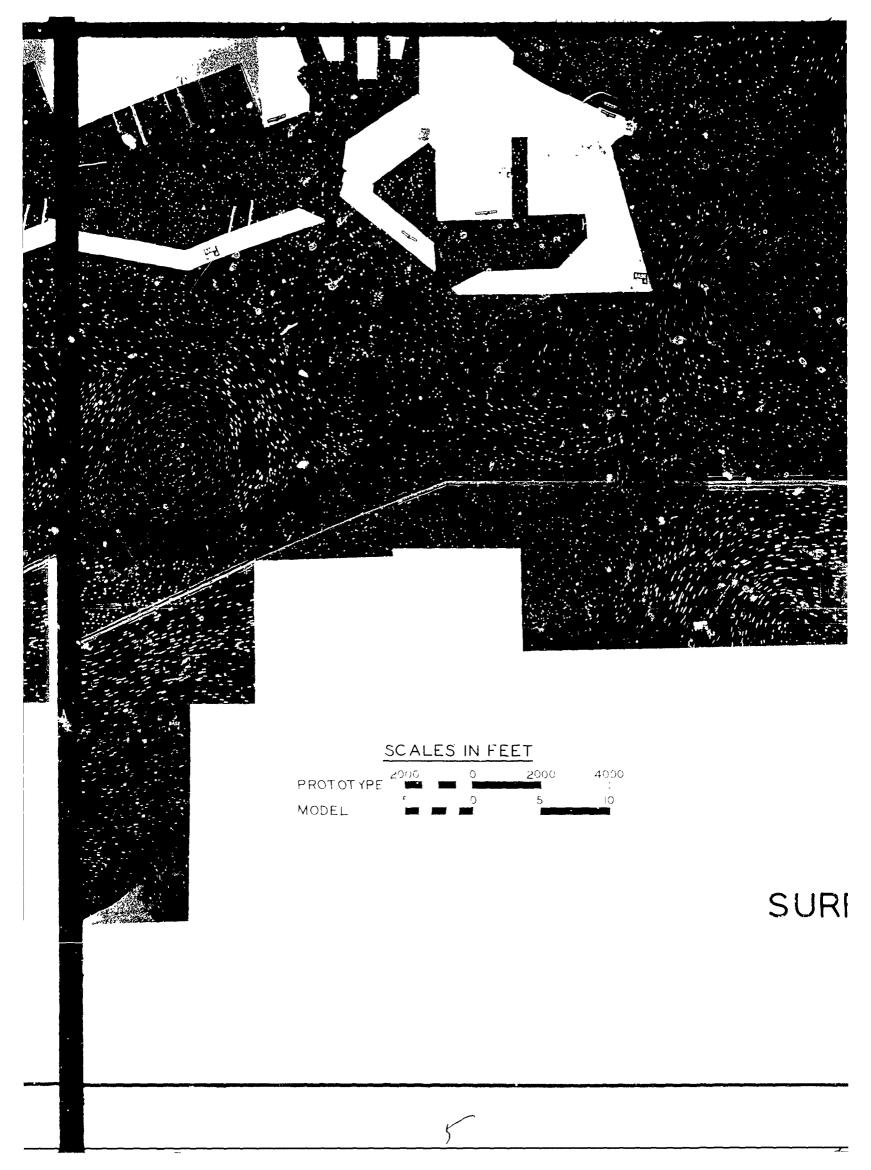
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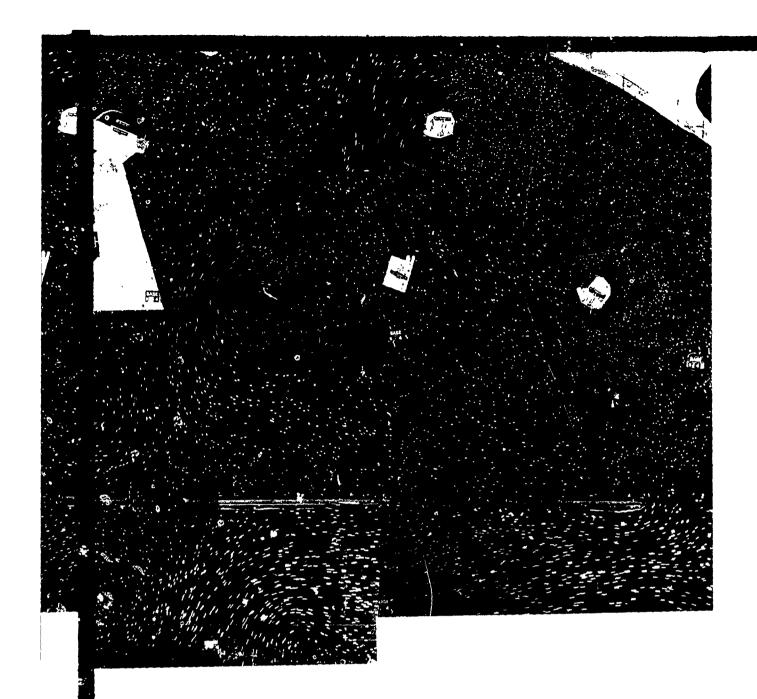












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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE HOUR 4

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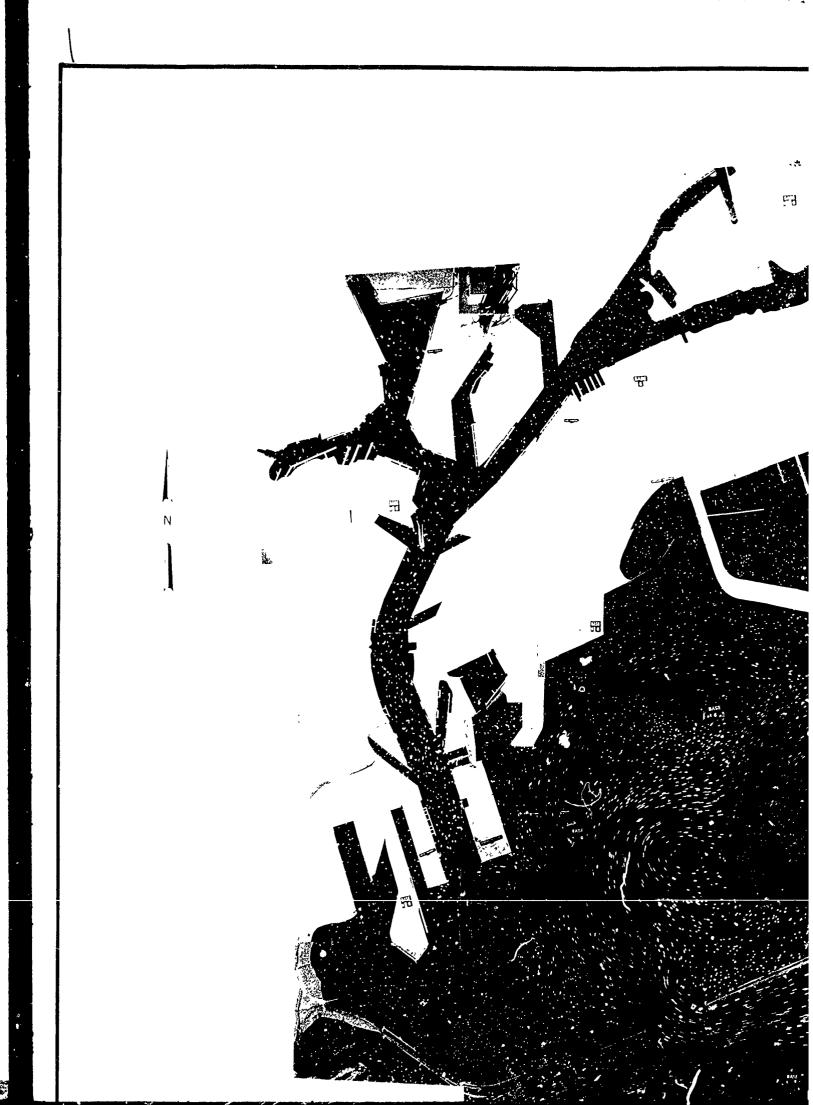
VELOCITY SCALE

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PROTOTYPE LLLL . J

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

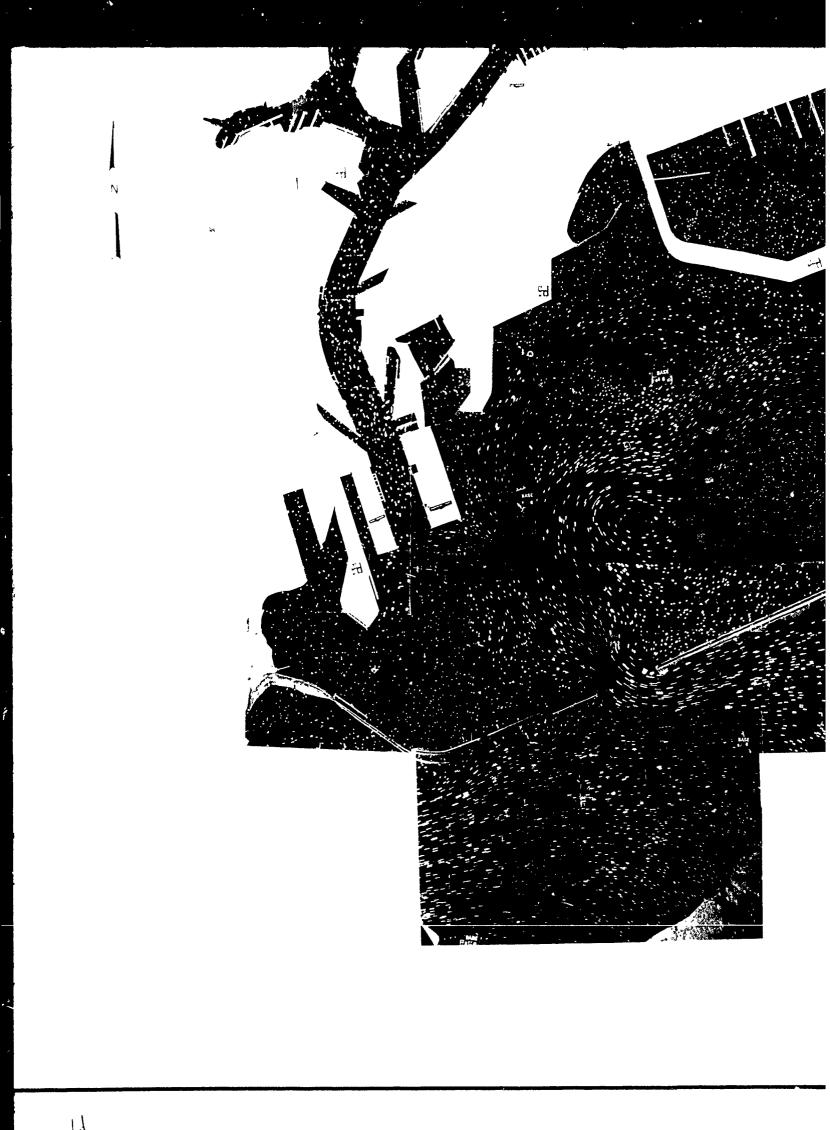


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VELOCITY SCALE





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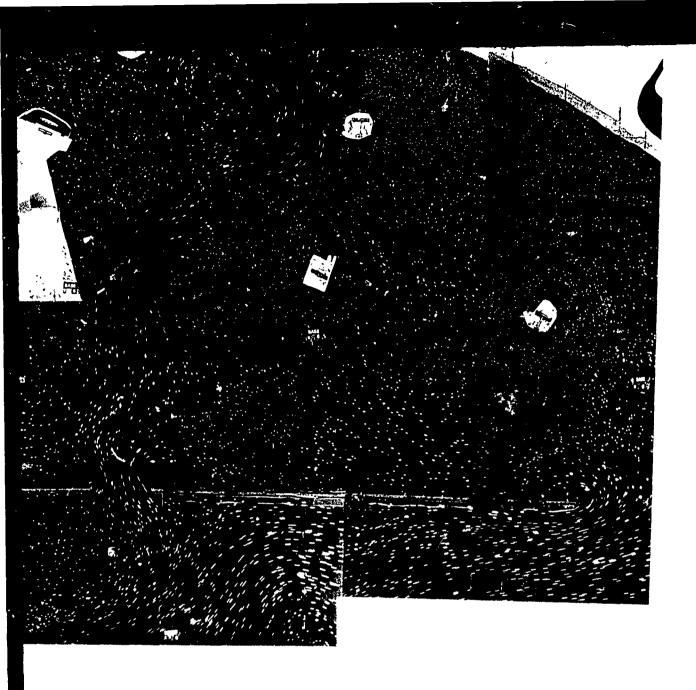
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VELOCITY SCALE

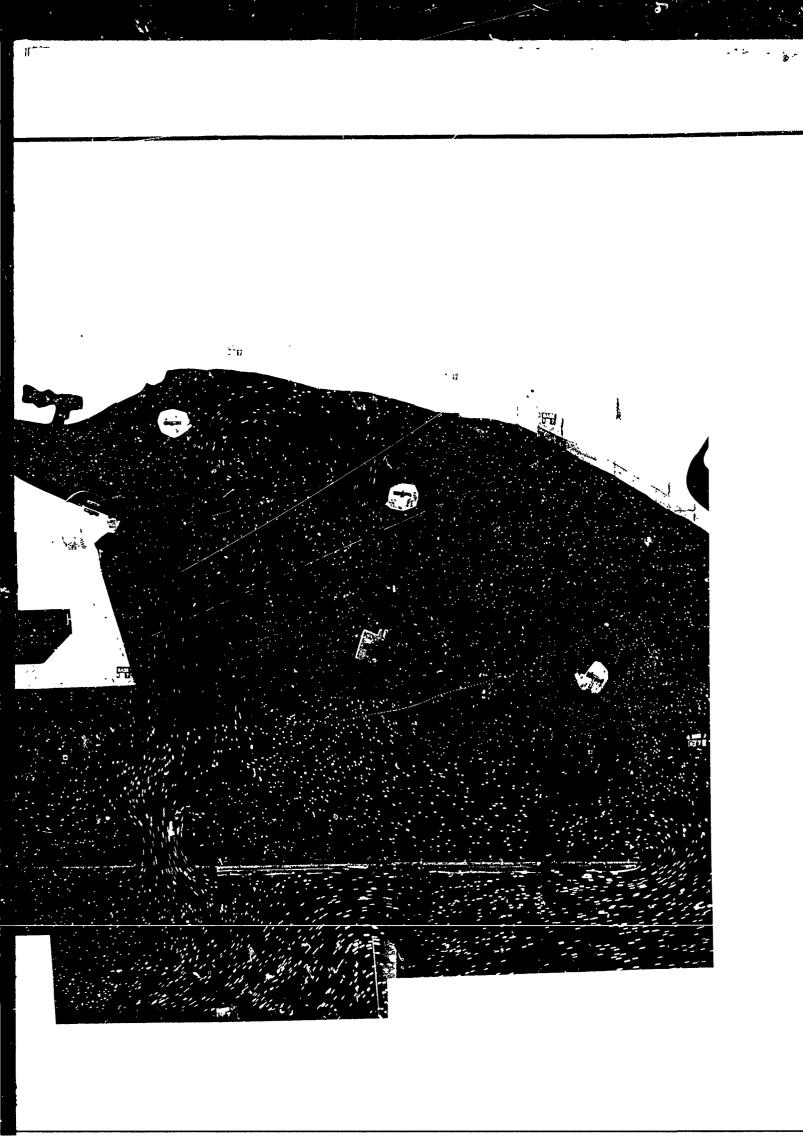
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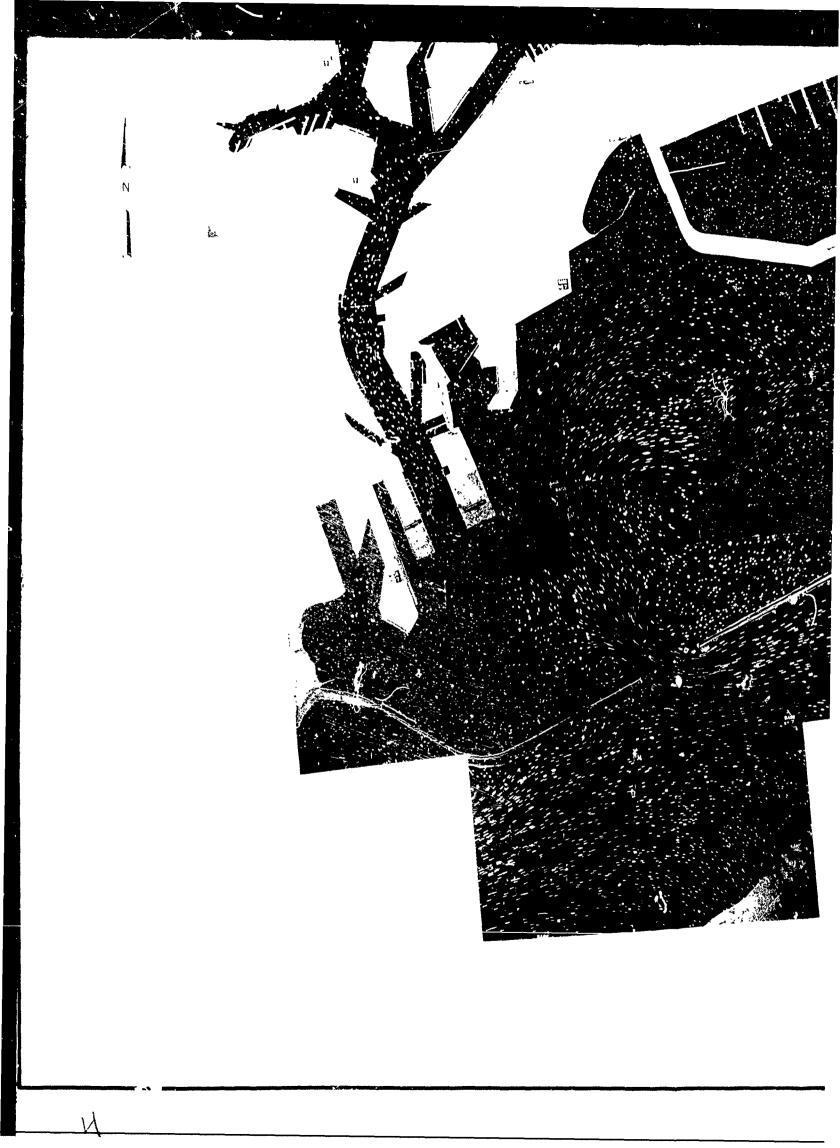
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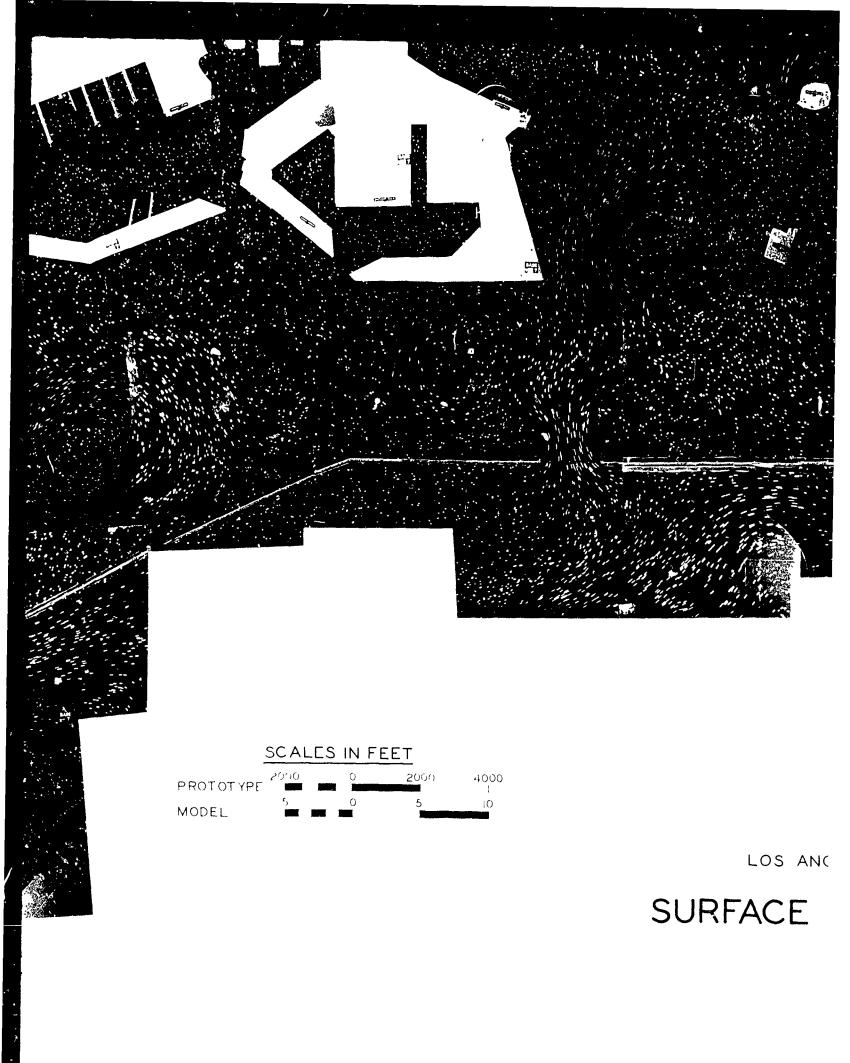
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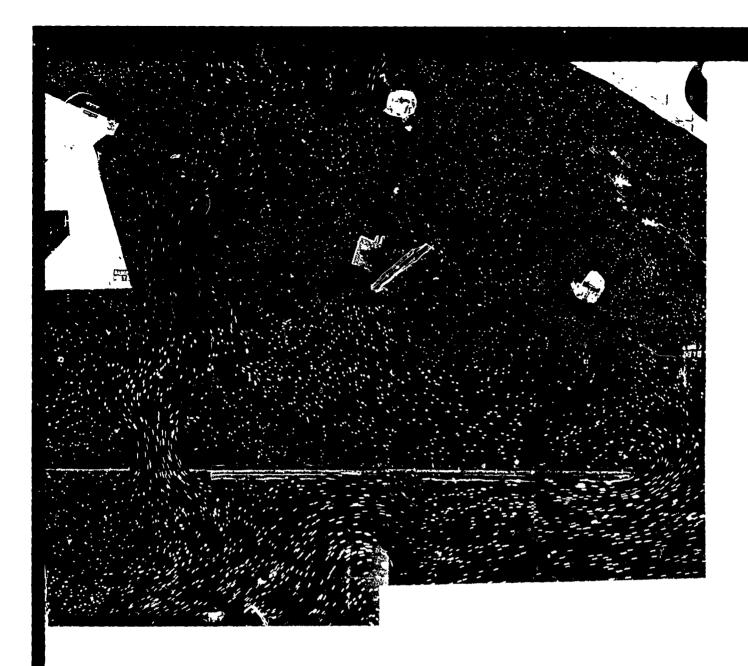












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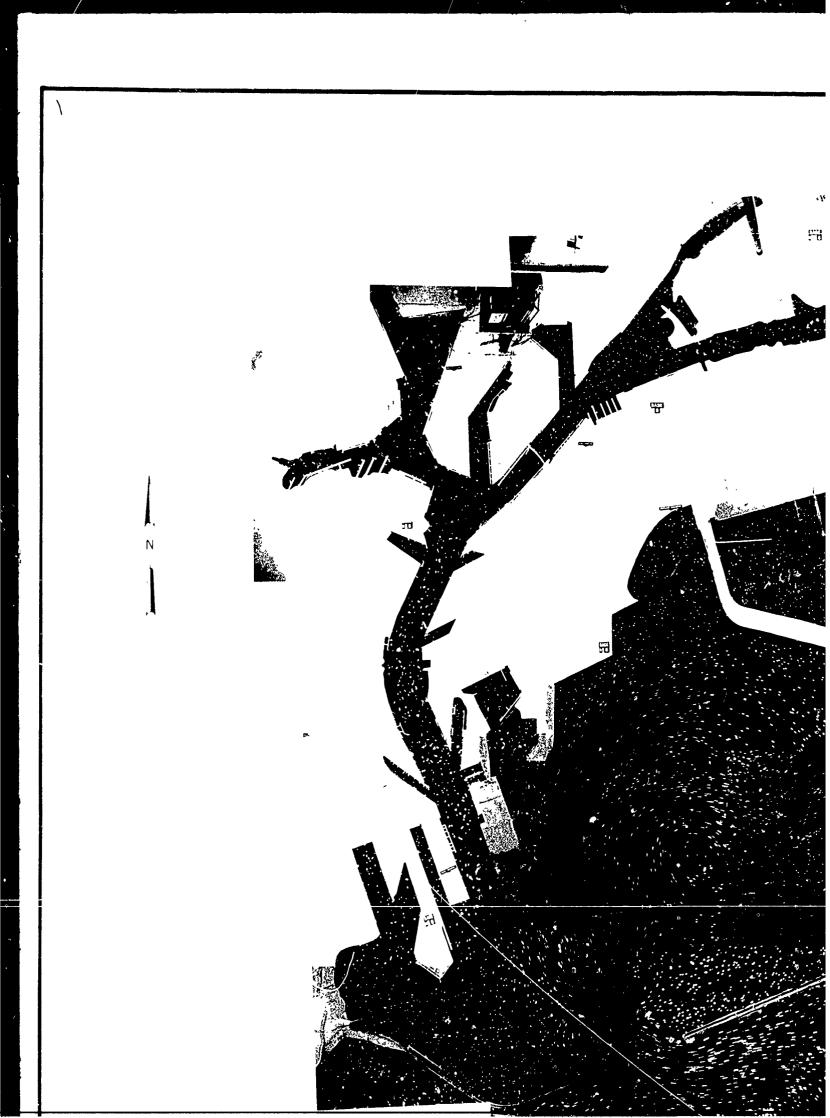
VELOCITY SCALE

1 0 1 2 3 FPS

PROTOTYPE Lund 1 . .

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

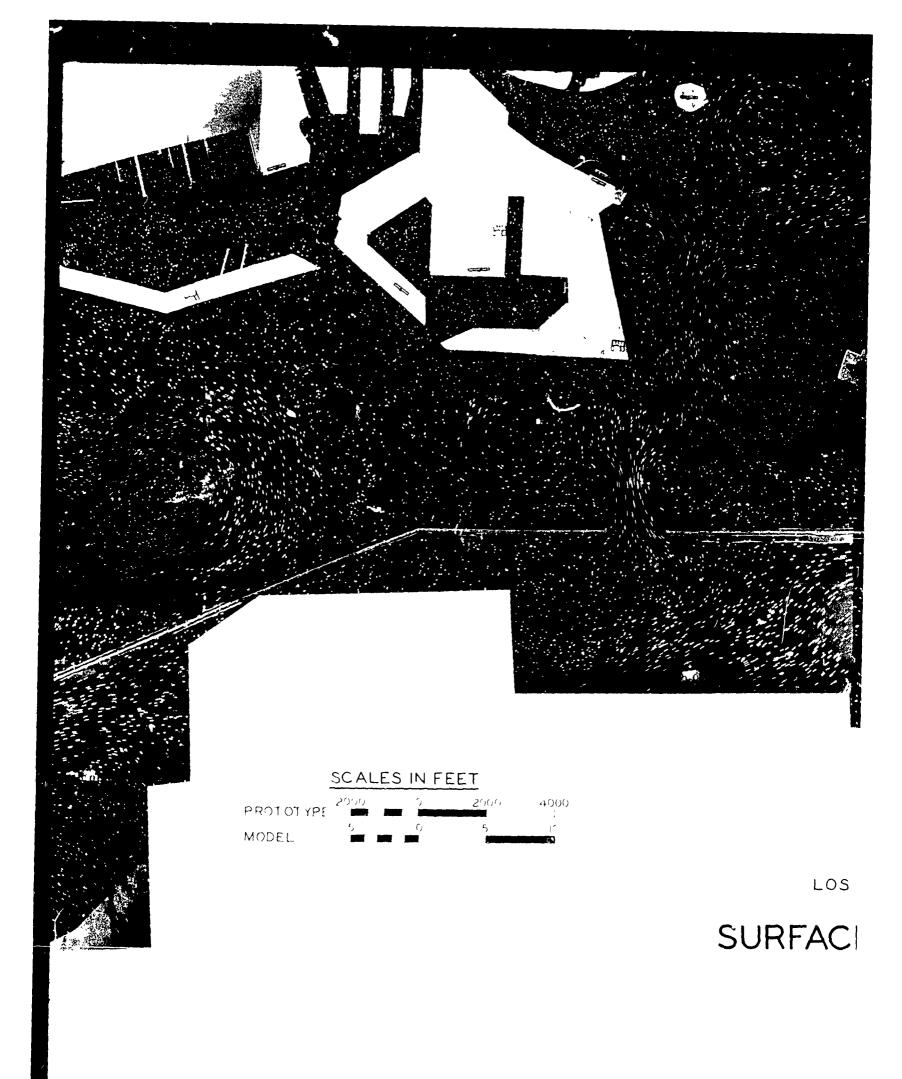
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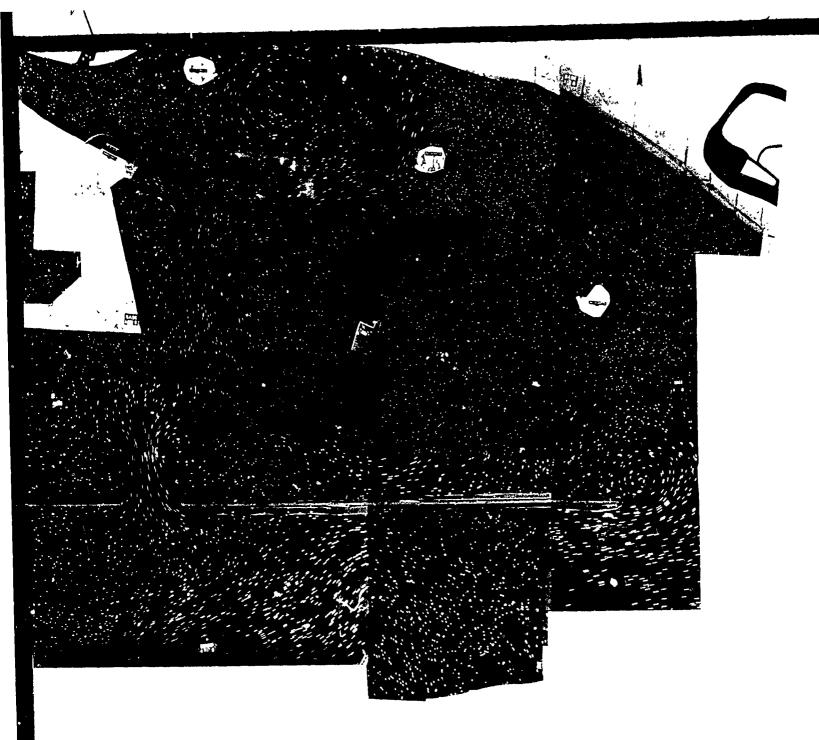












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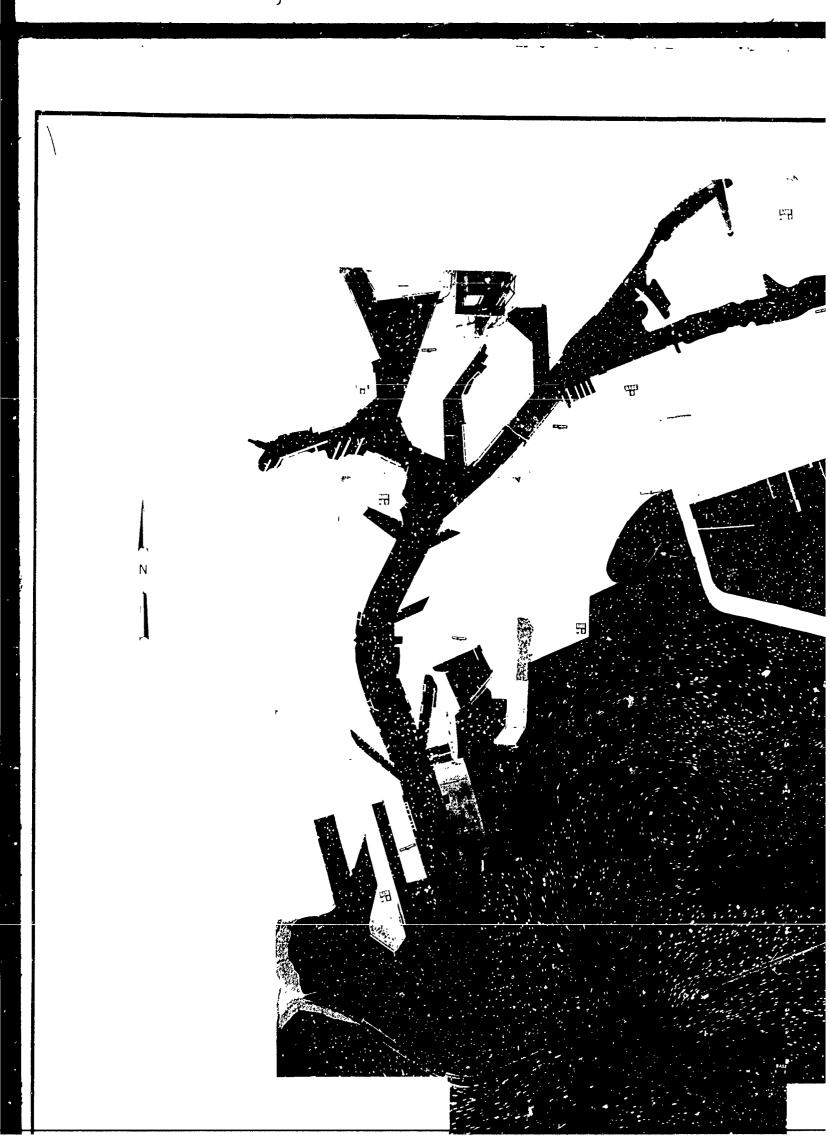
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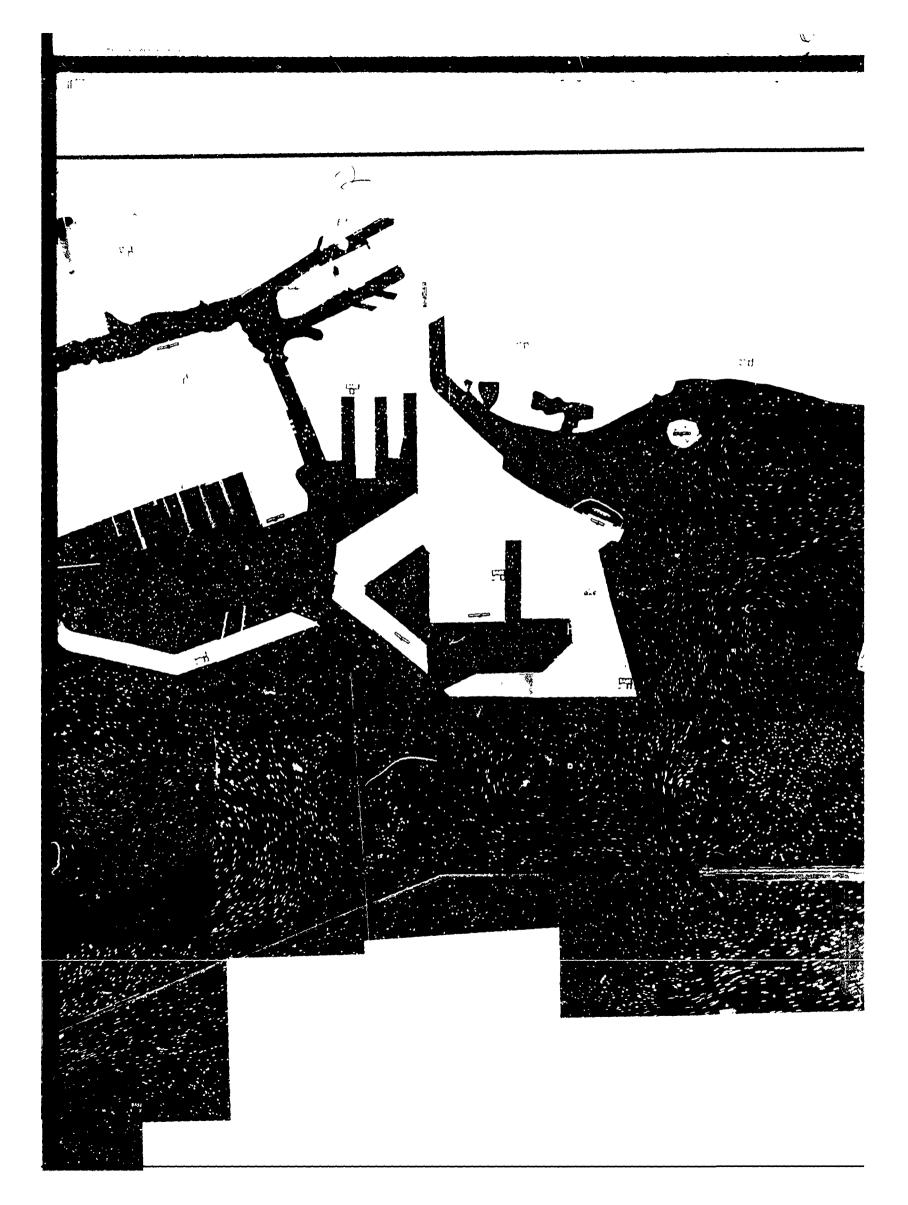
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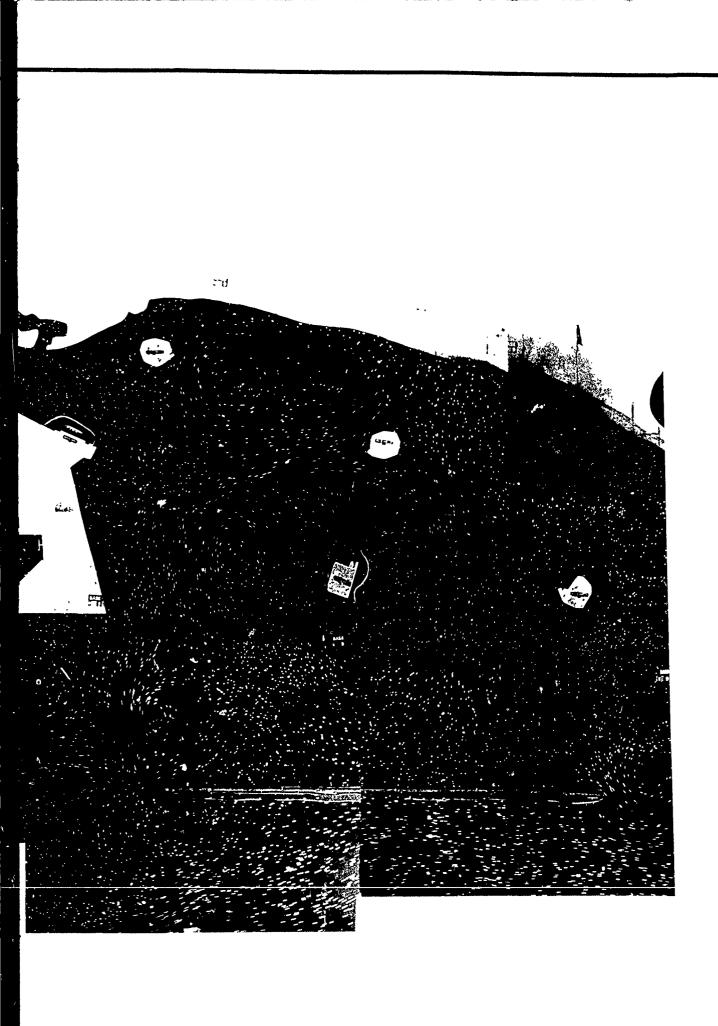
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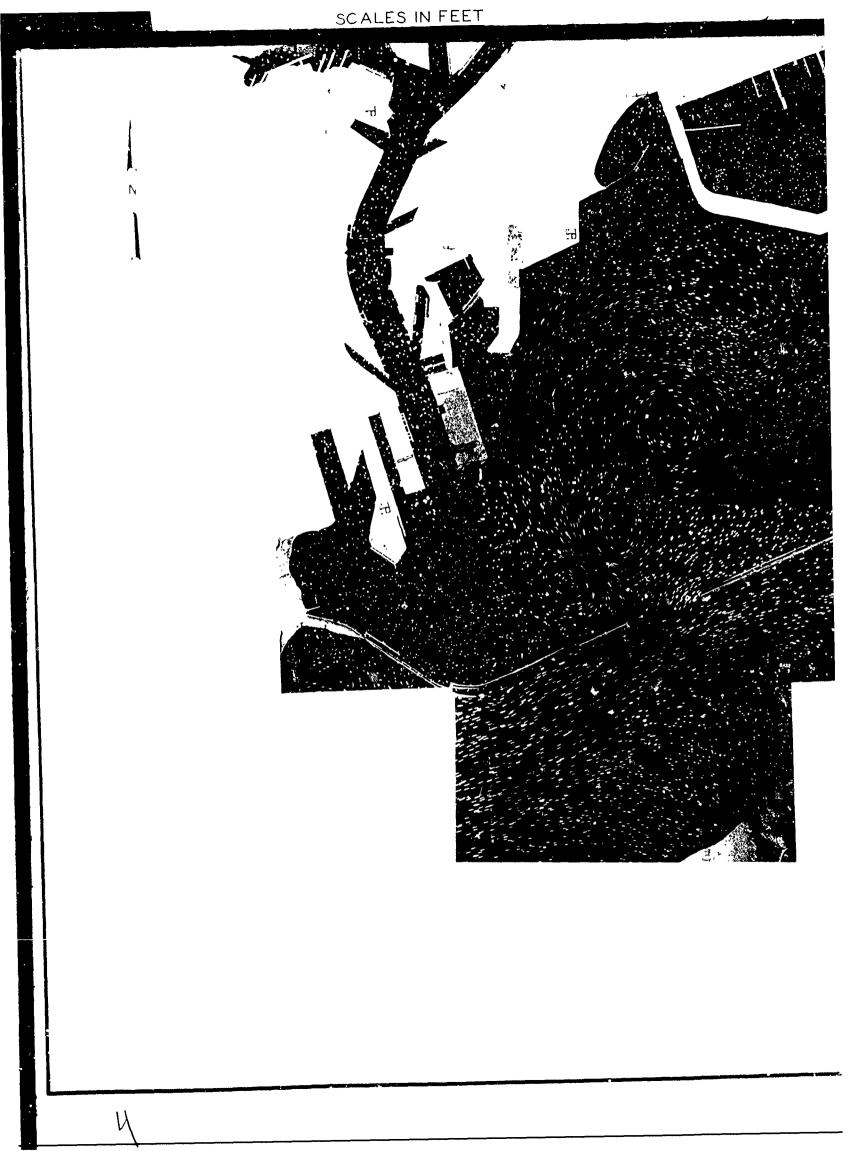
SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE











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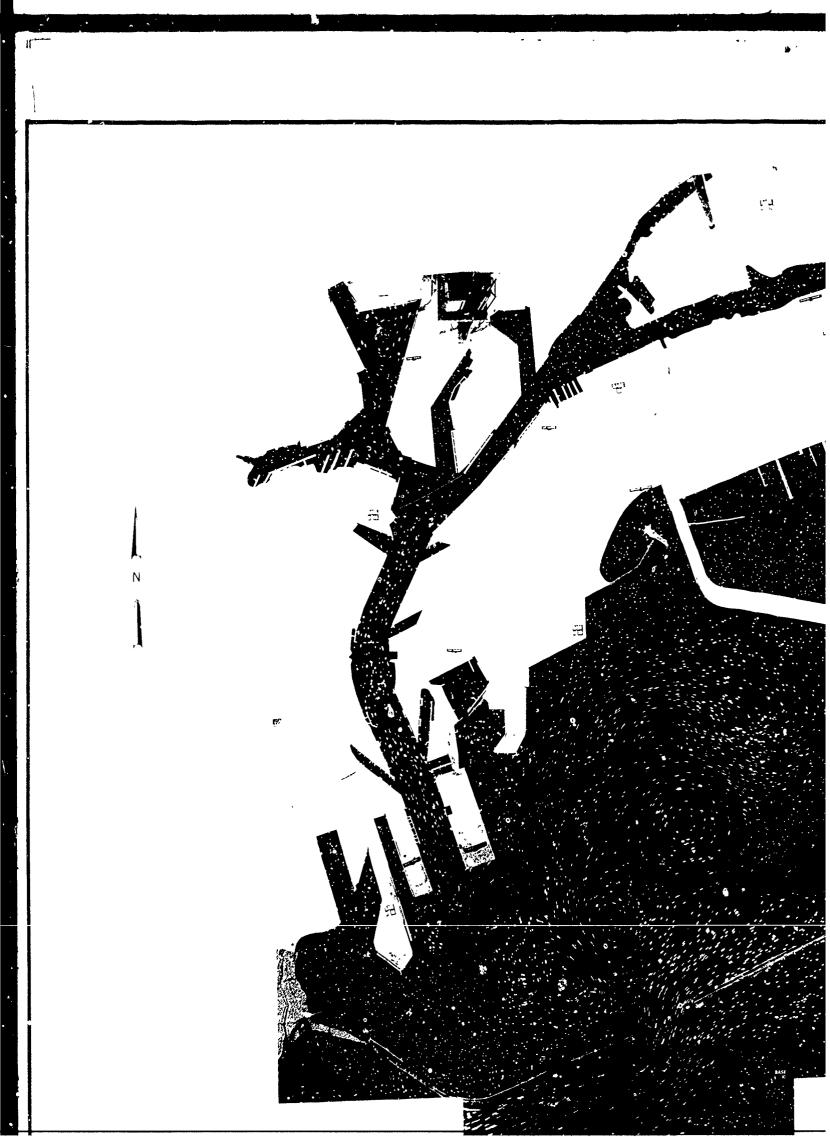


VELOCITY SCALE

PROTOTYPE LLL . . .

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS



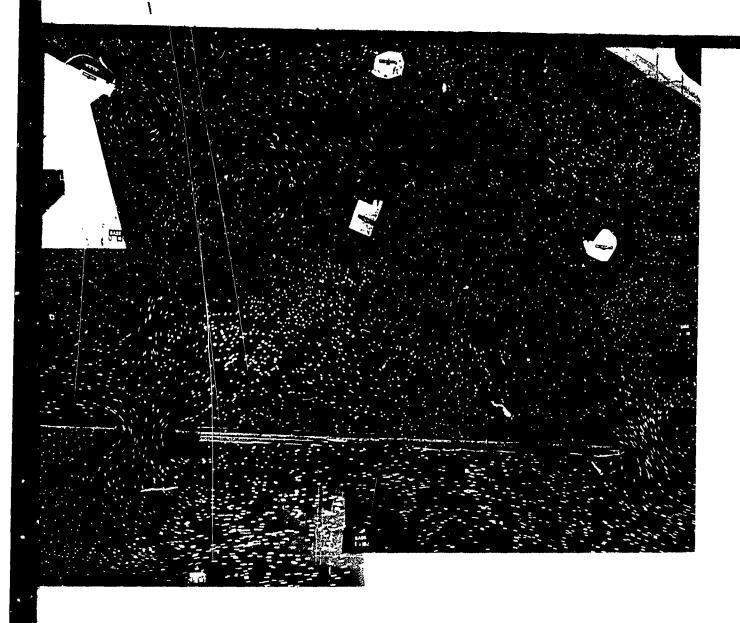








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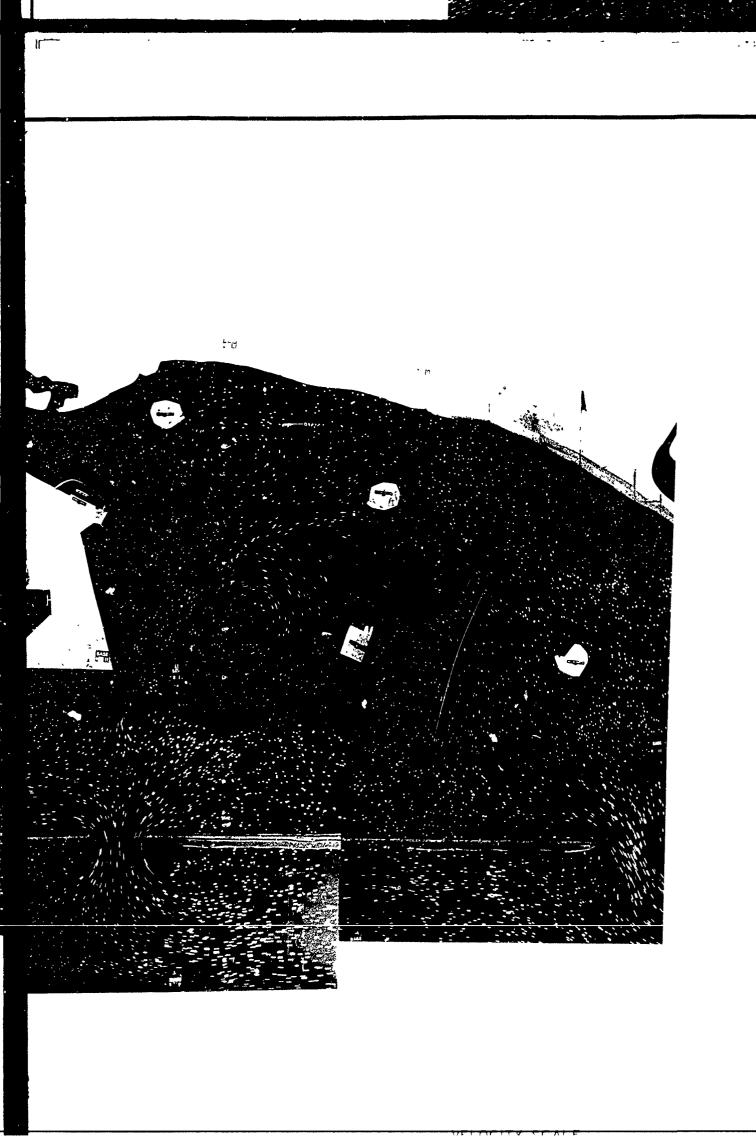
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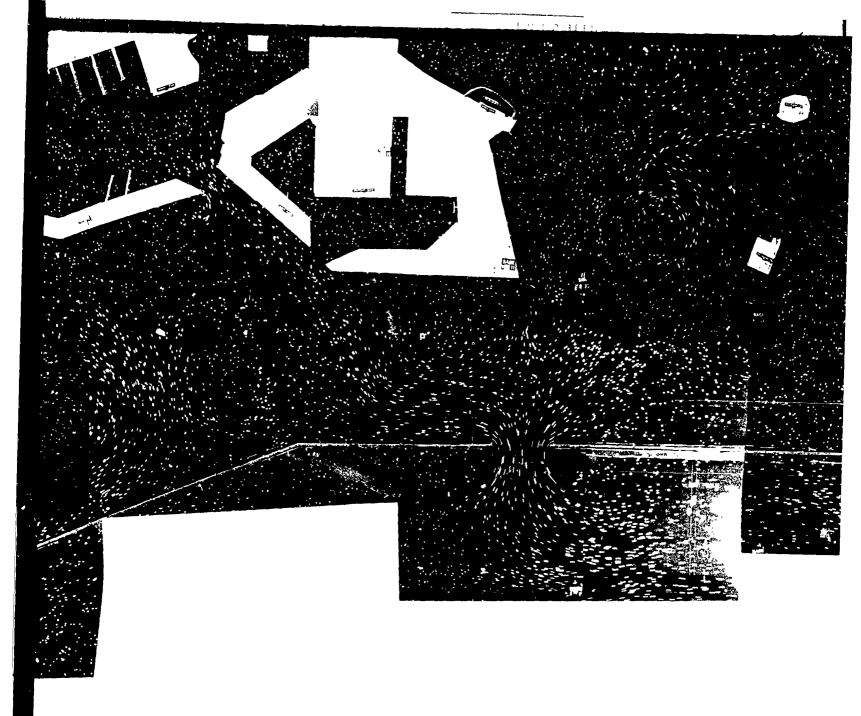
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS





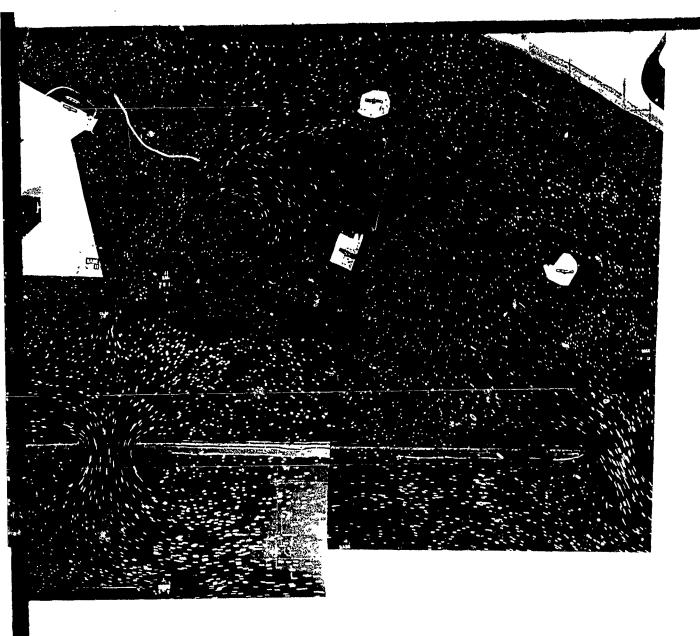


SCALES IN FEET



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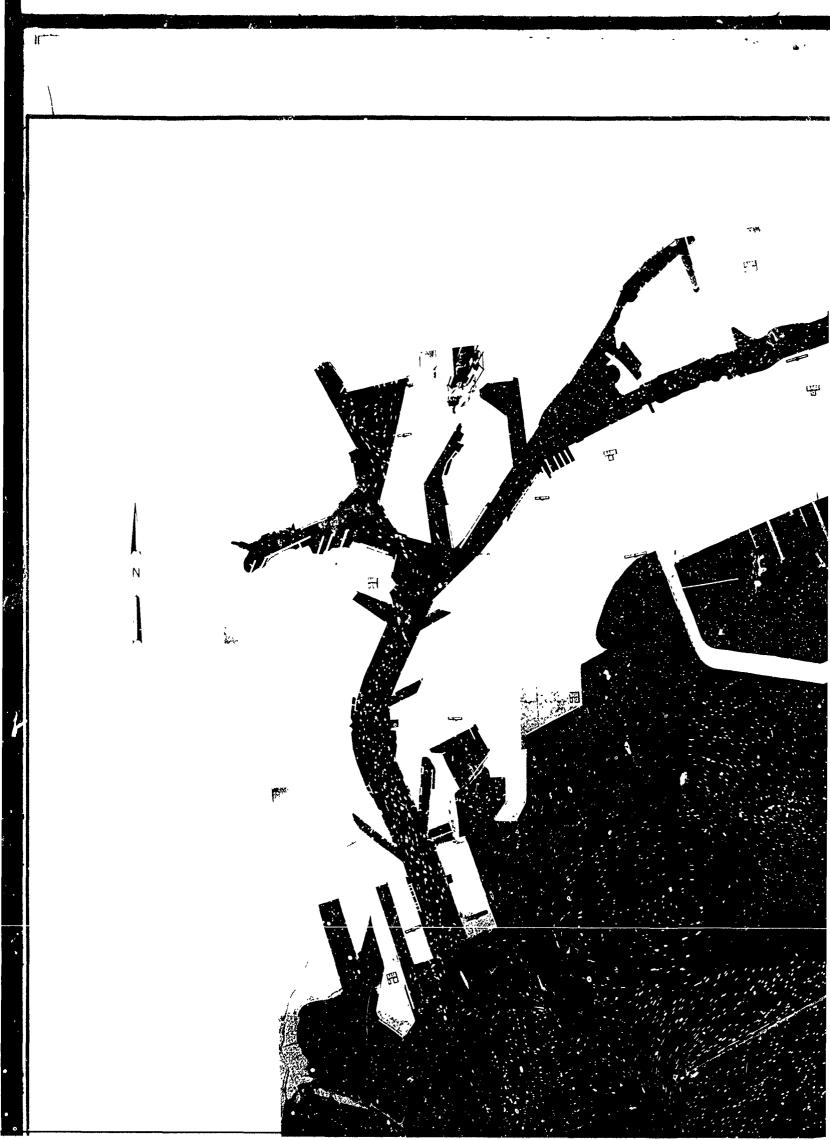
VELOCITY SCALE

1 0 1 2 3 FPS

PROTOTYPE LIMIT J

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

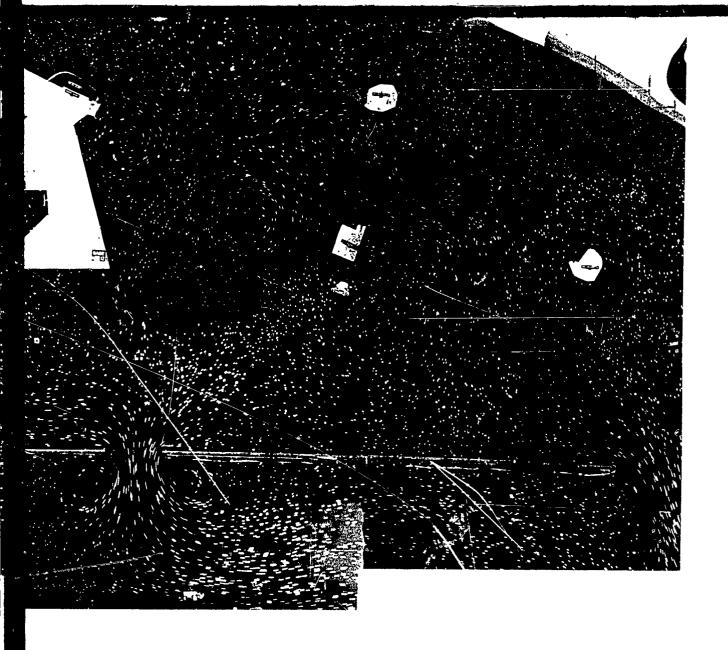












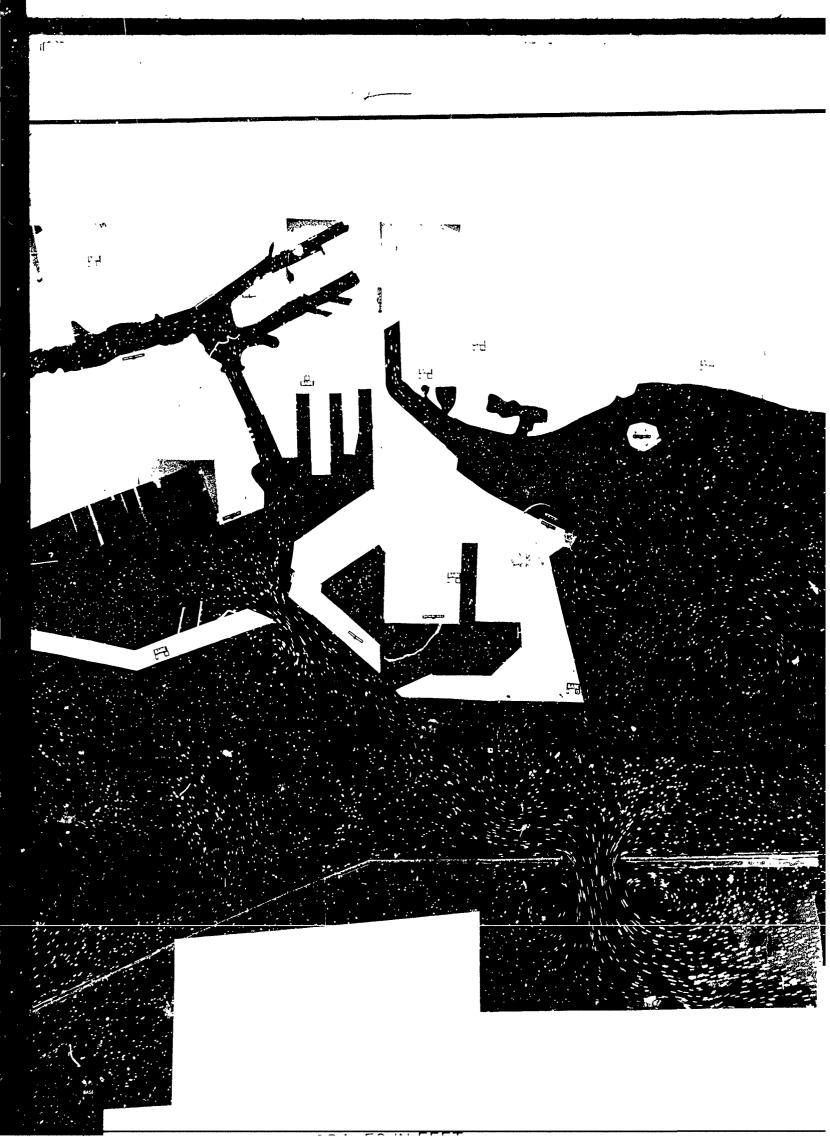
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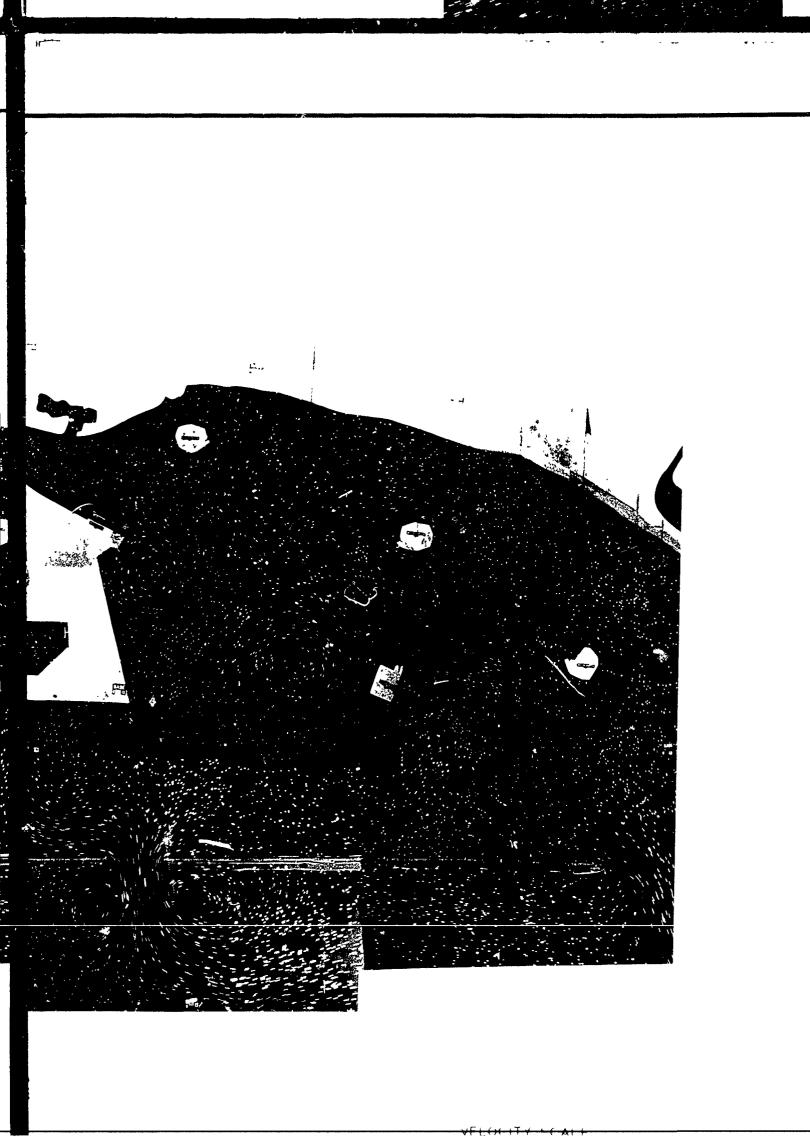
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

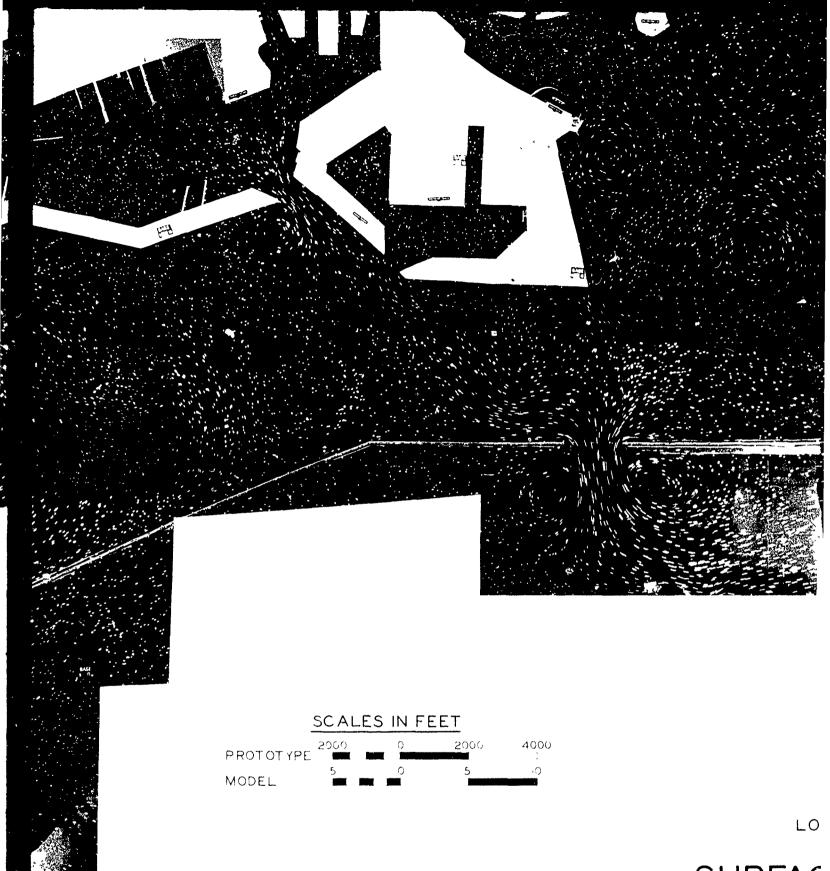
SURFACE CURRENT PATTERNS





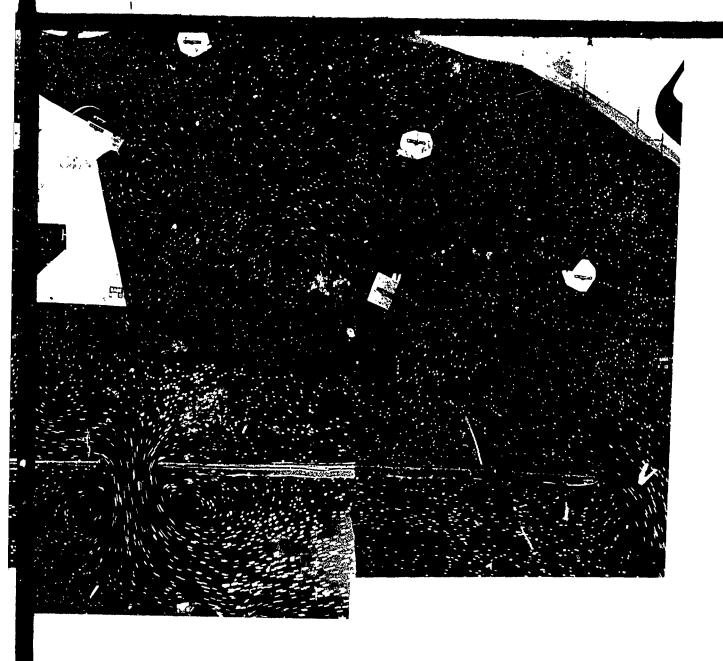






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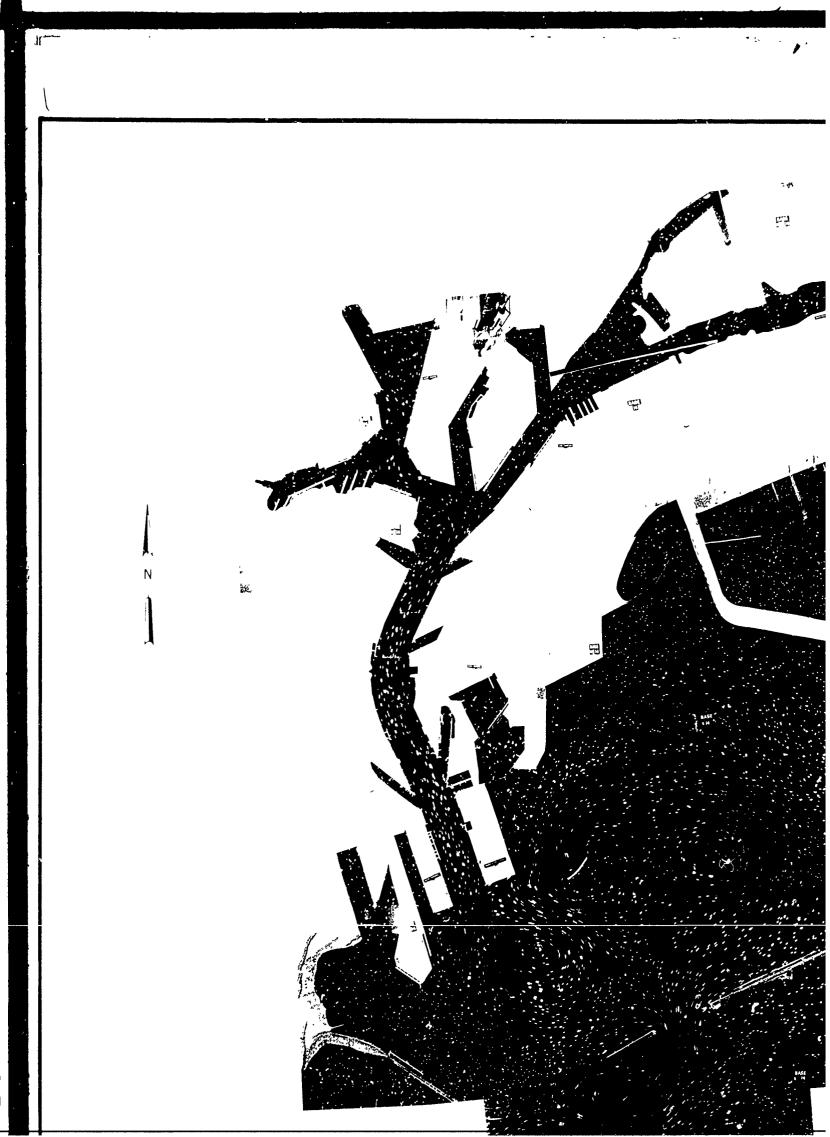




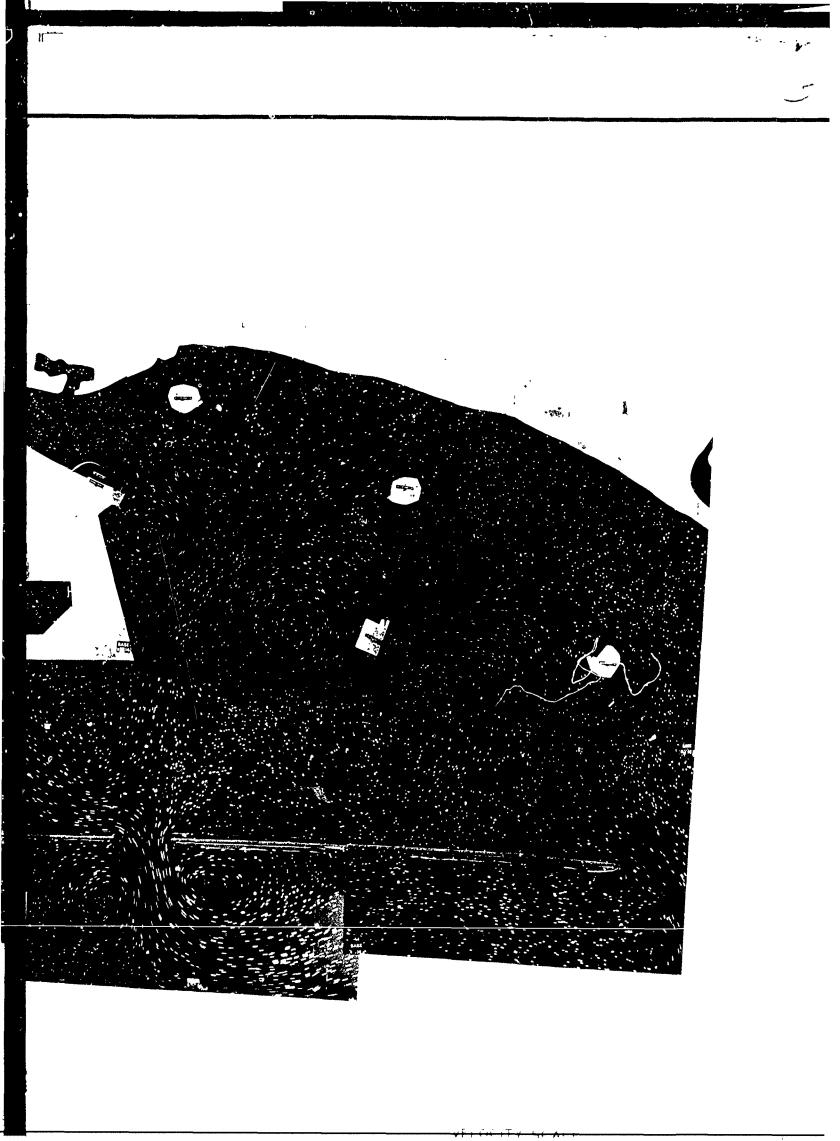
PROTOTYPE | 1 0 1 2 3 FPS

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

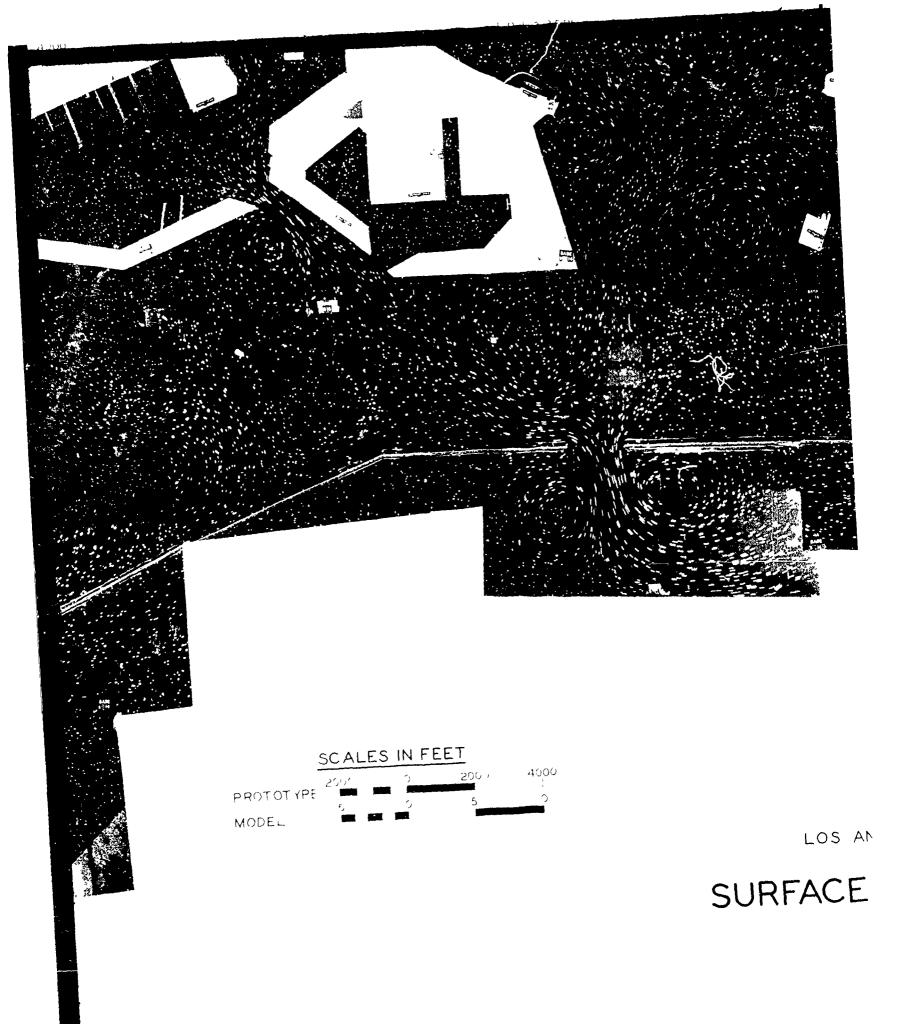
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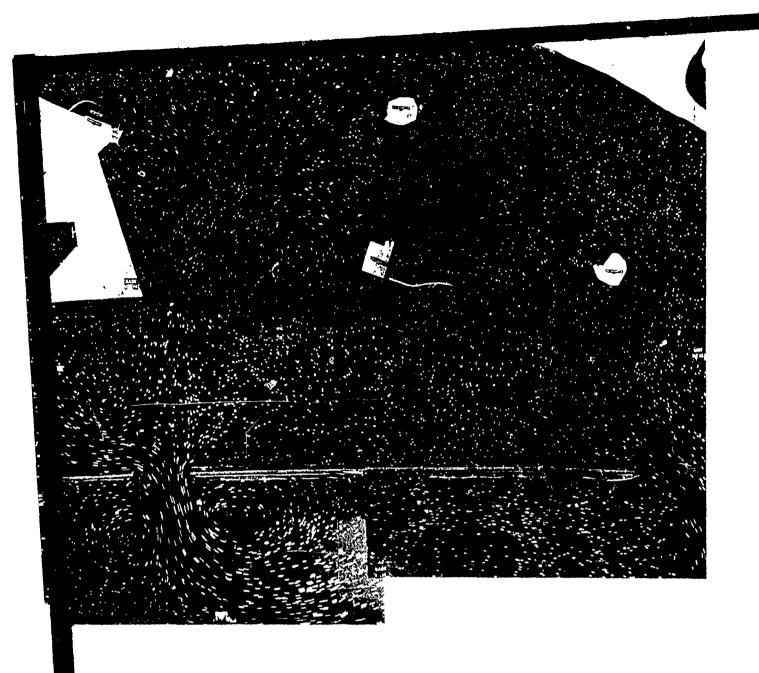












VELOCITY SCALE

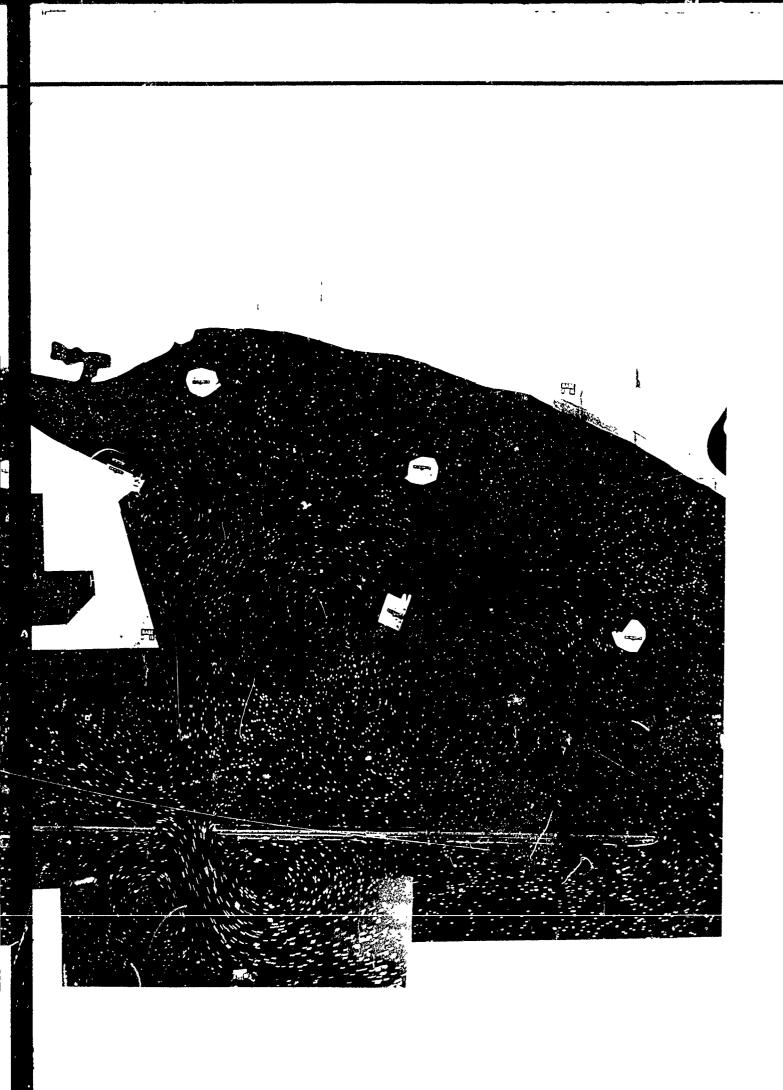
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SURFACE CURRENT PATTERNS

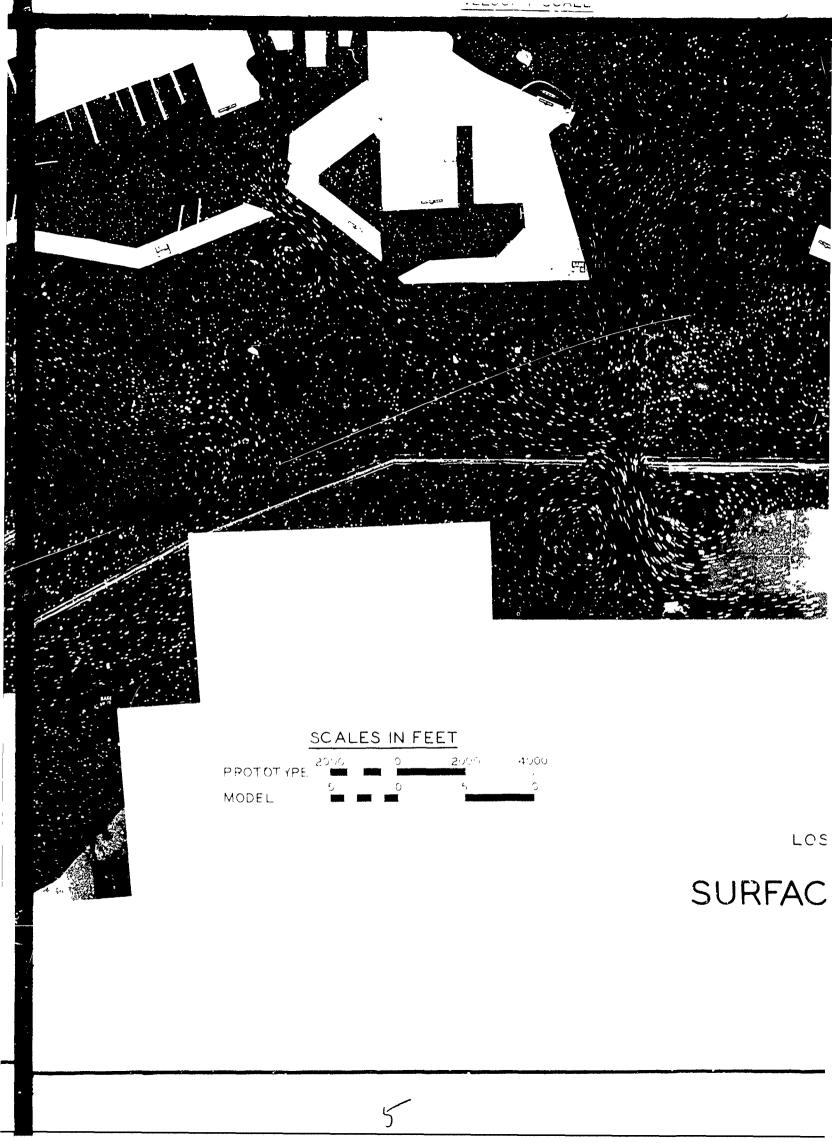


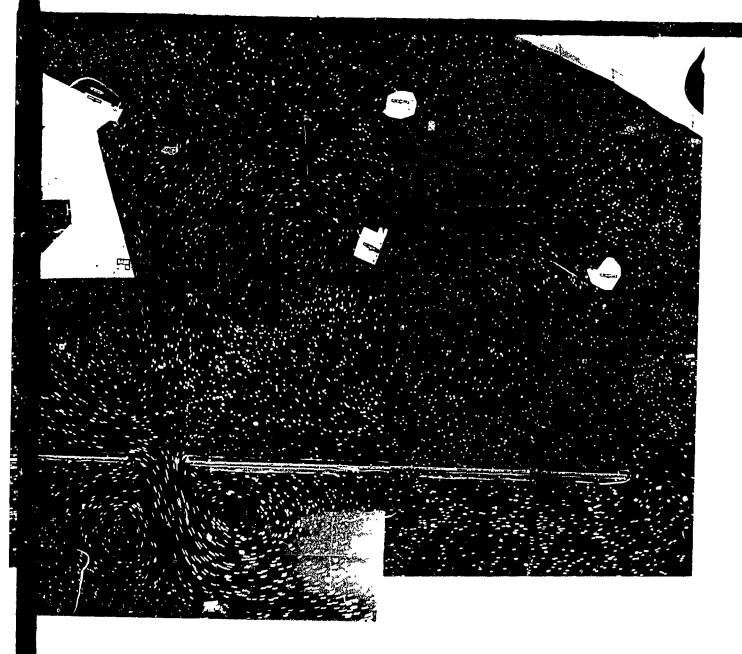
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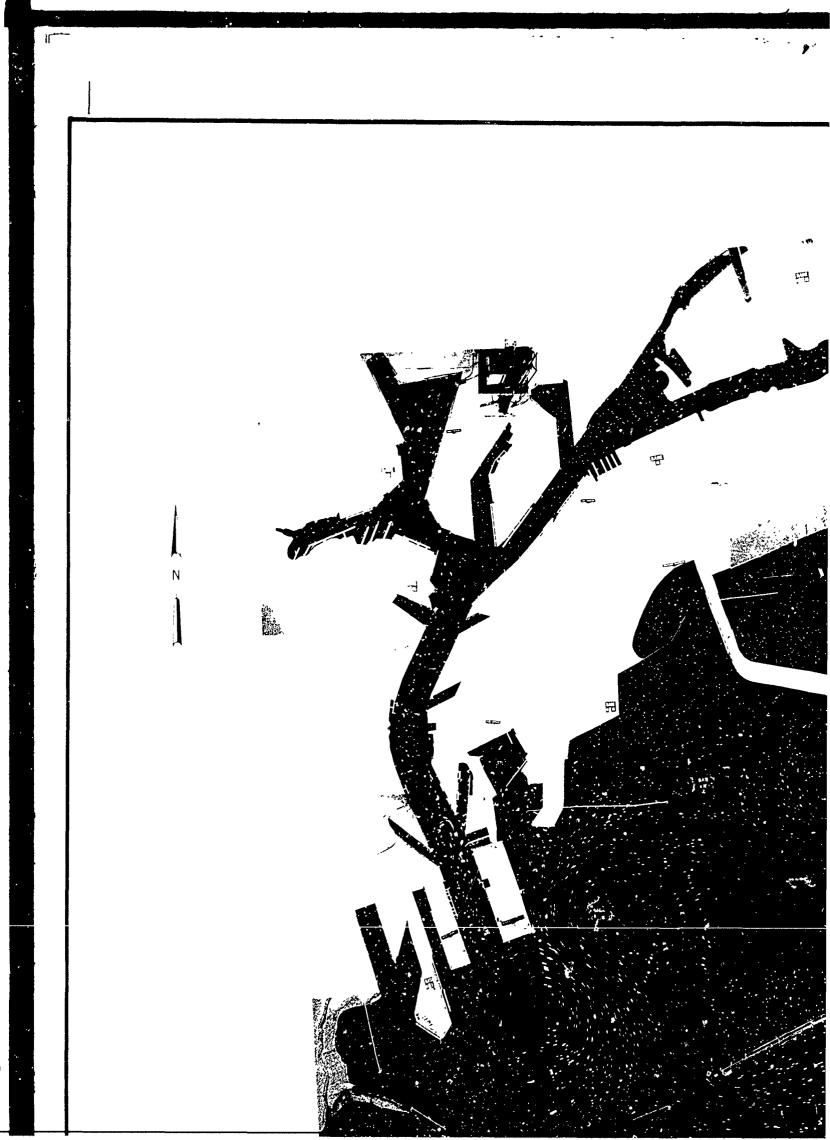


VELOCITY SCALE

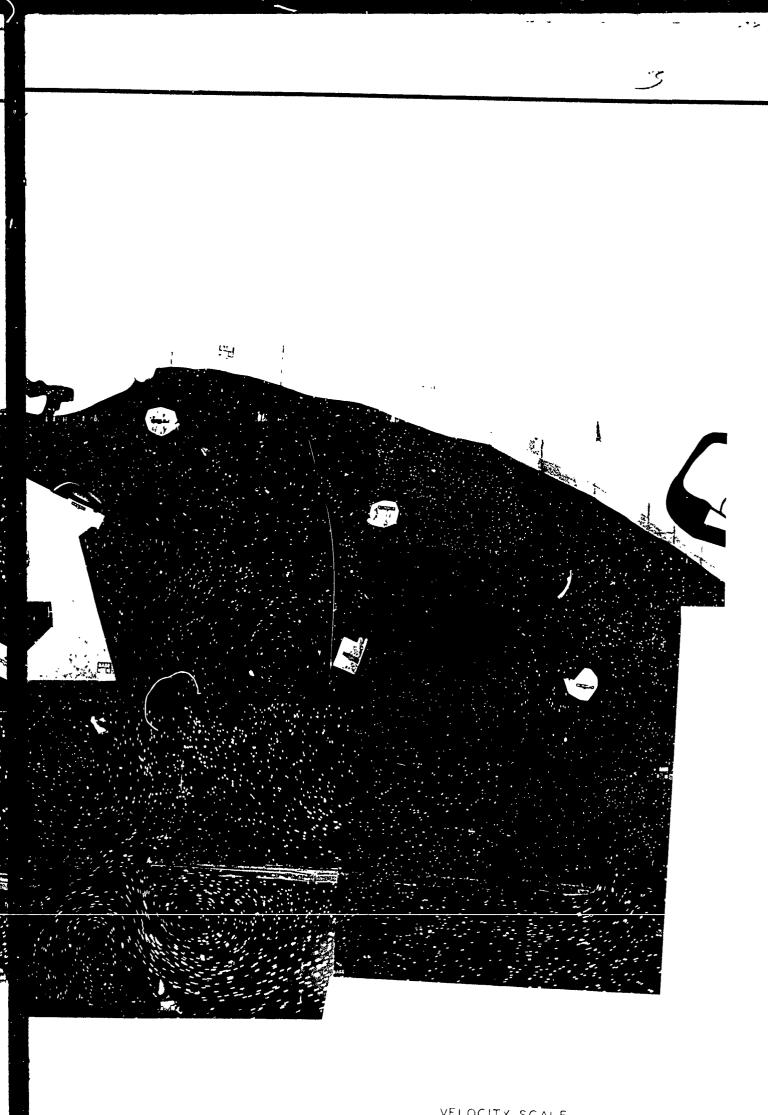
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

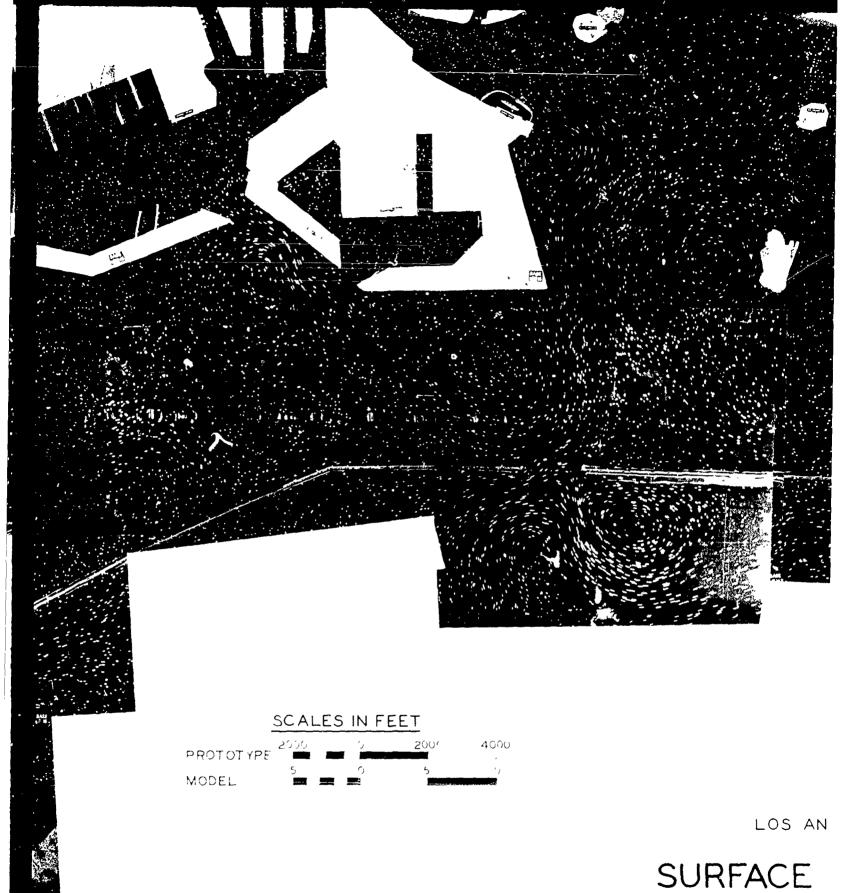
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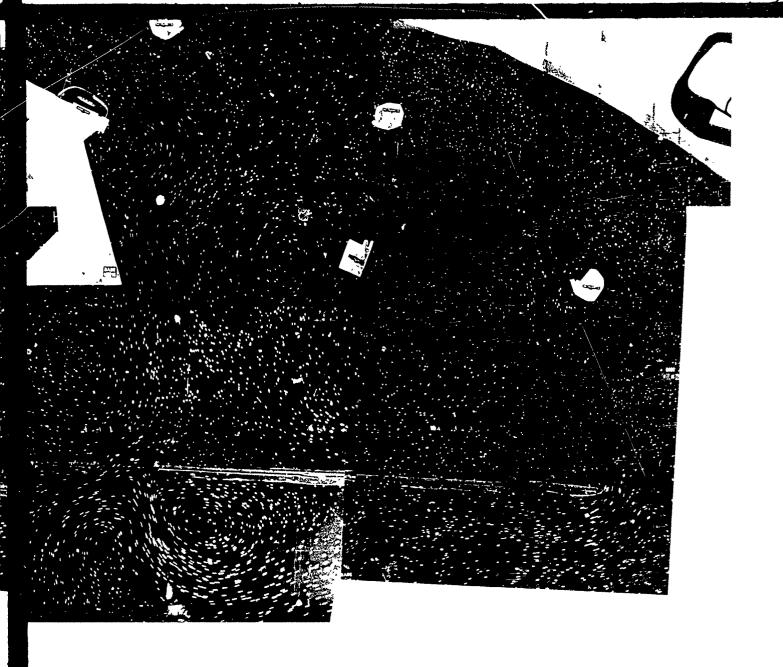










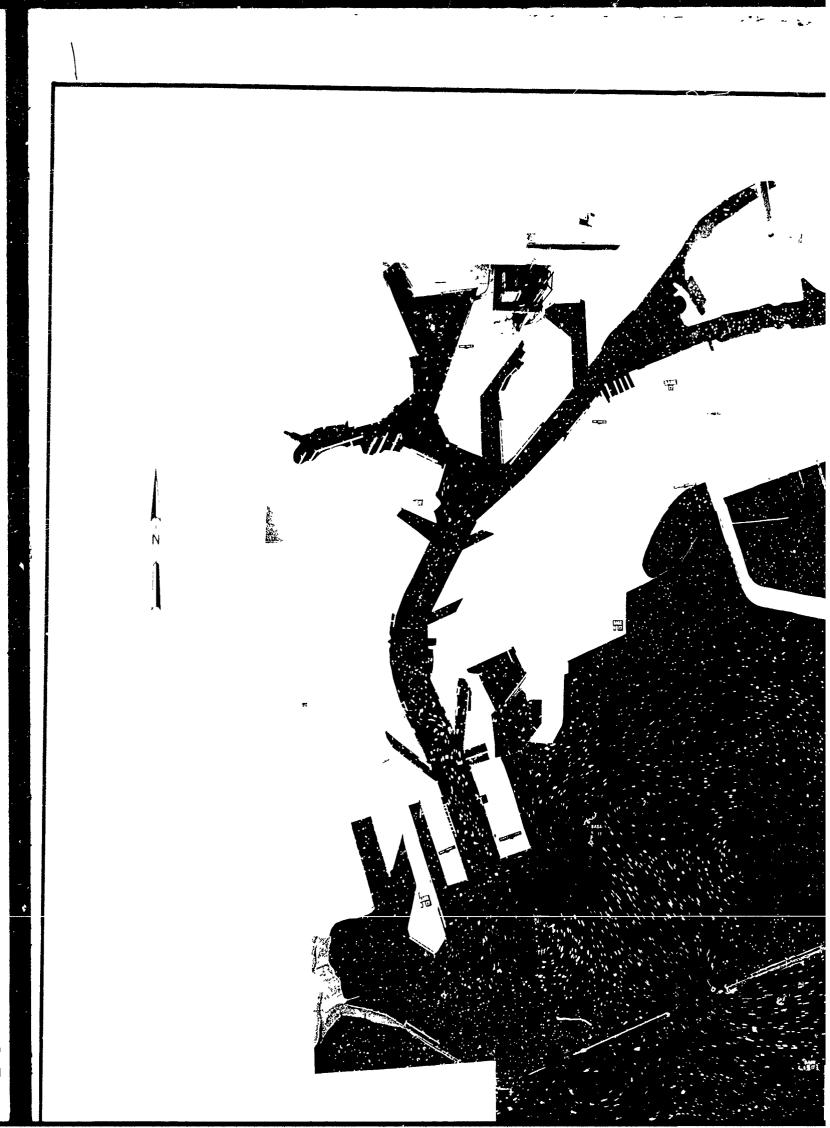


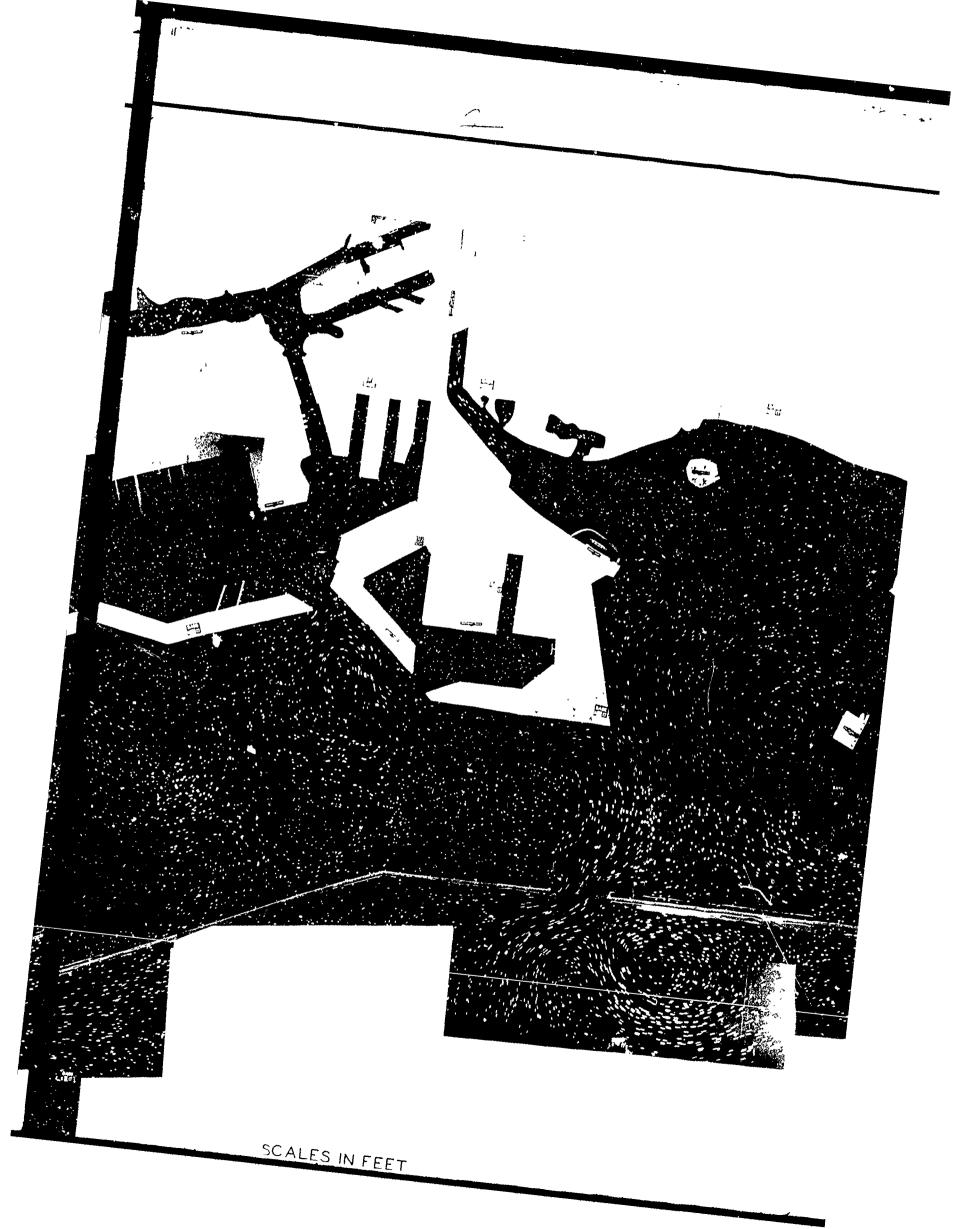
VELOCITY SCALE

PROTOTYPE LLLL . . .

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

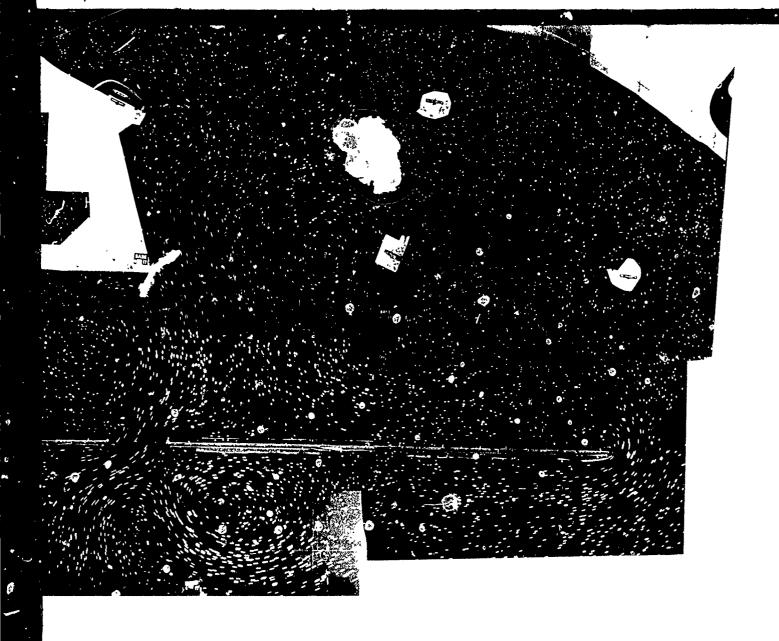












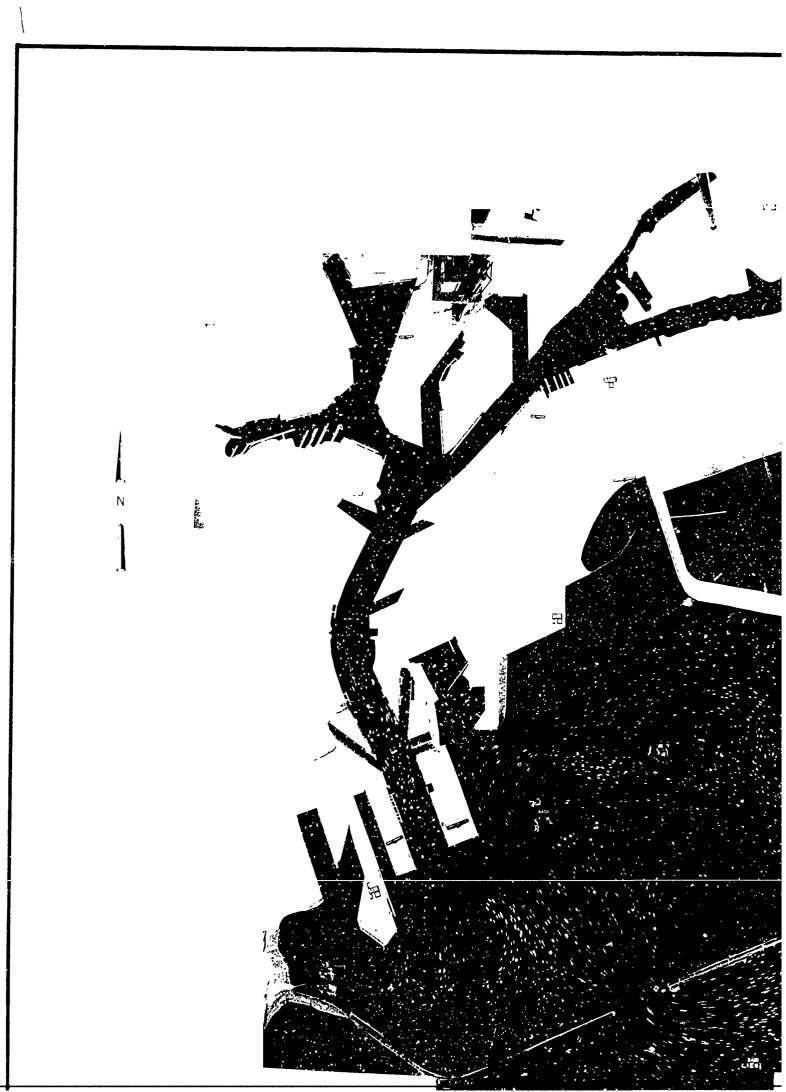
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VELOCITY SCALE

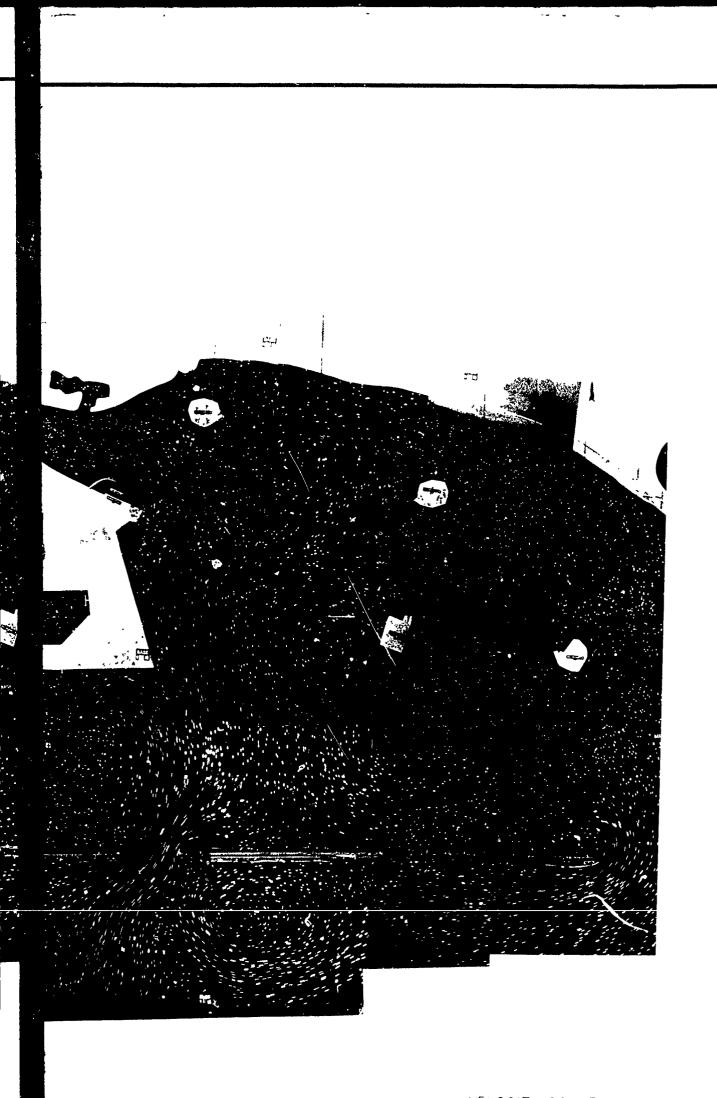
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

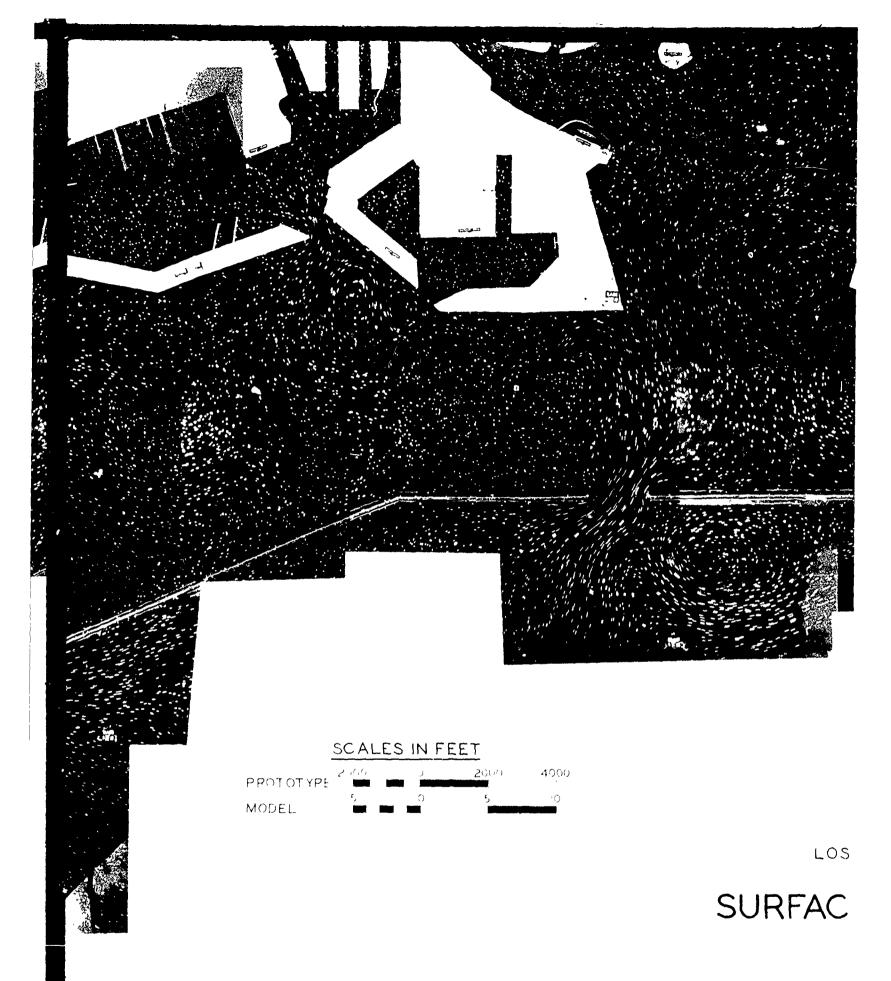
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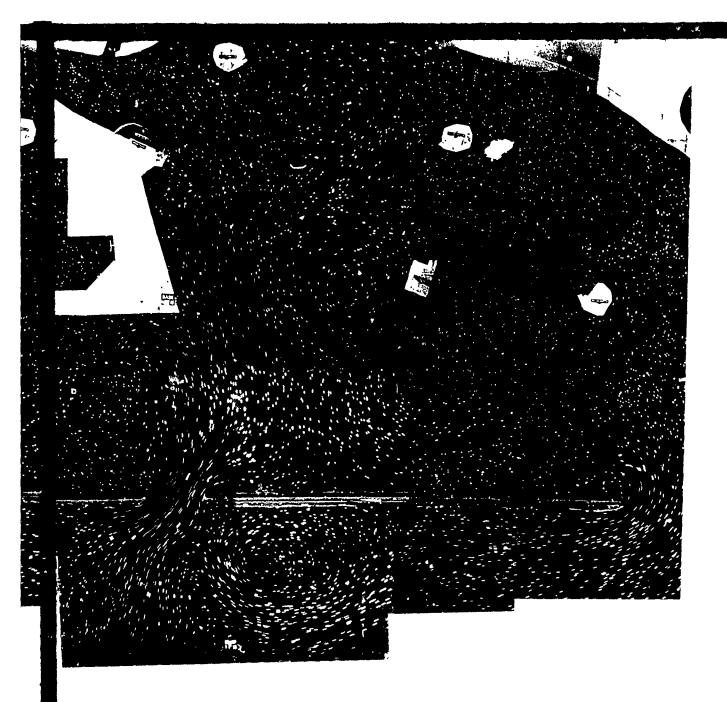












VELOCITY SCALE

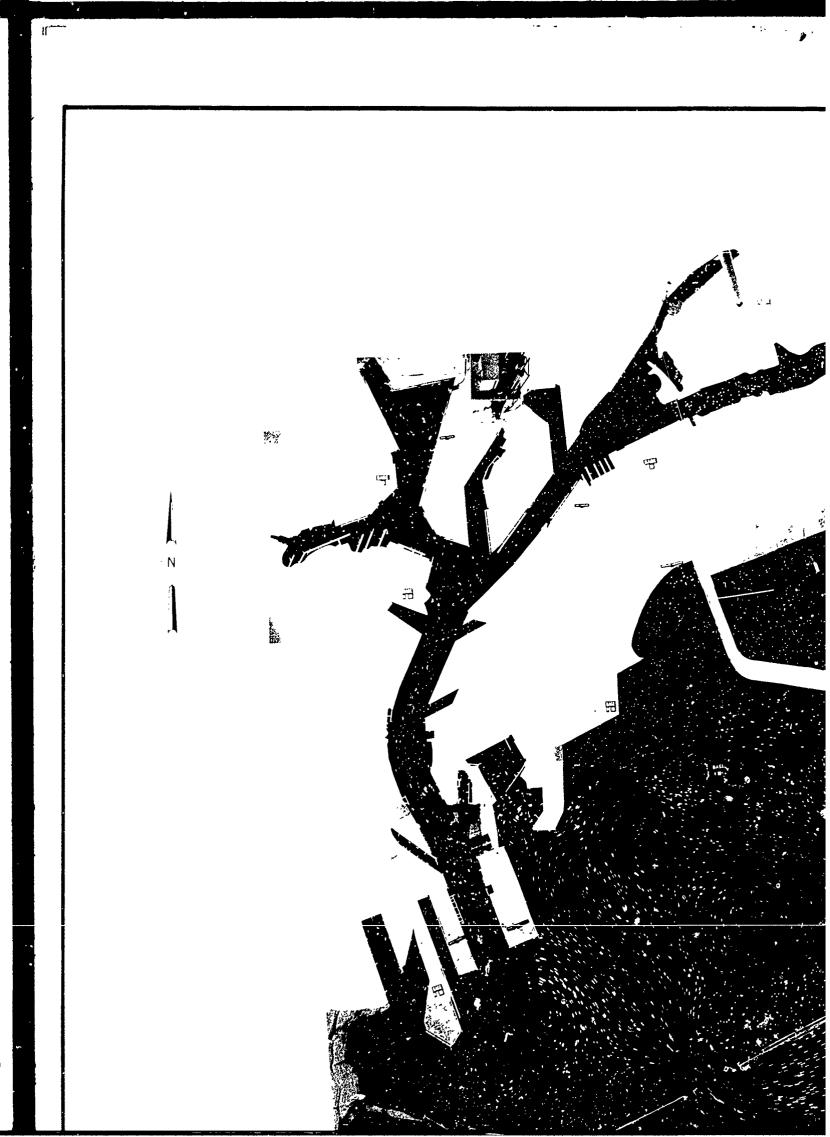
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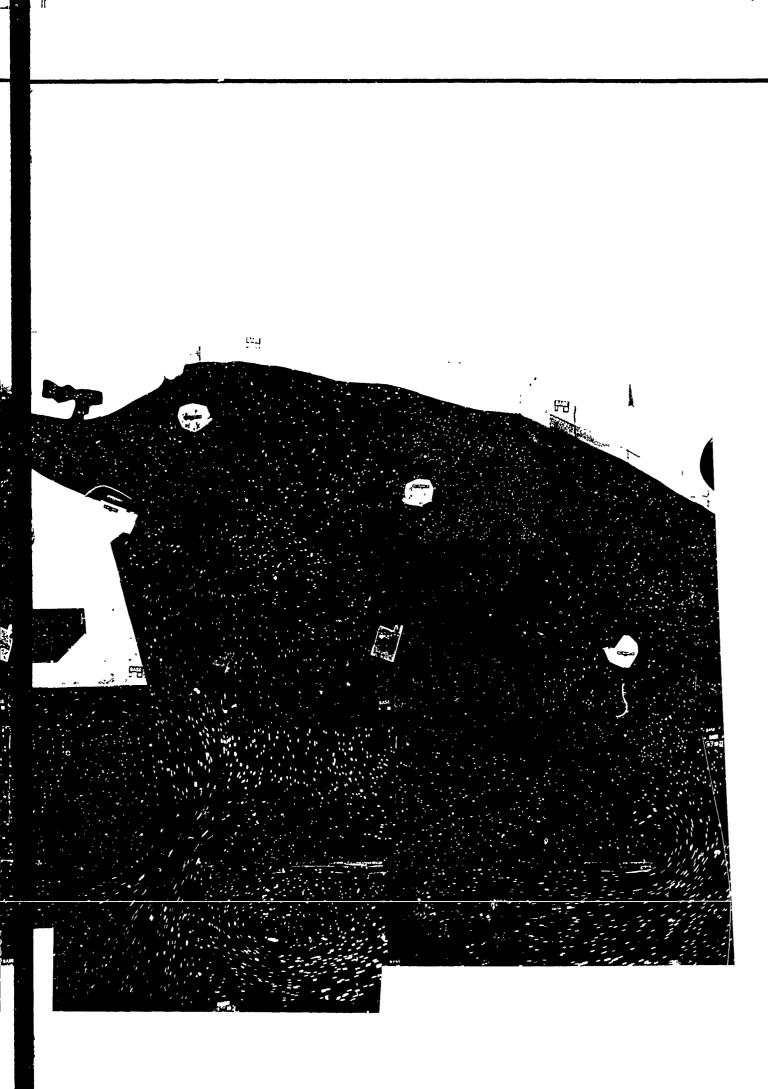
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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS



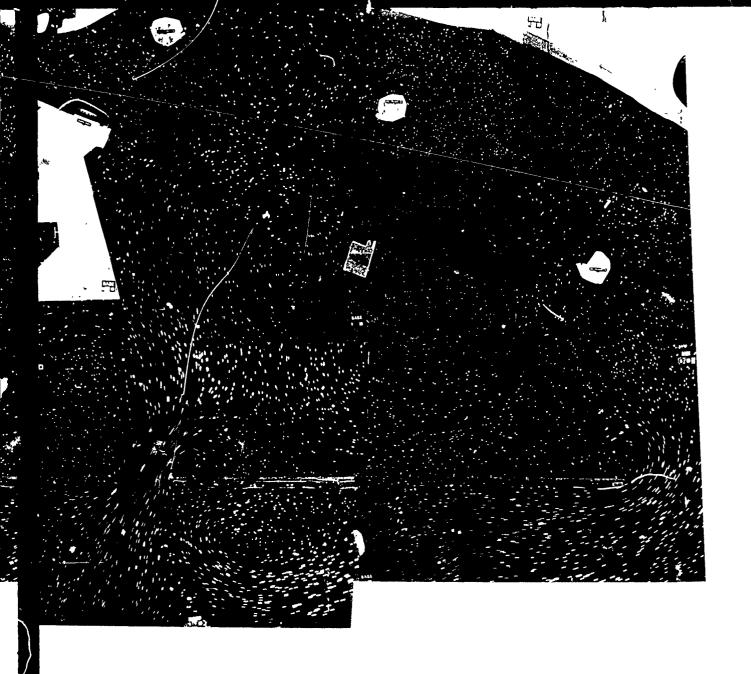








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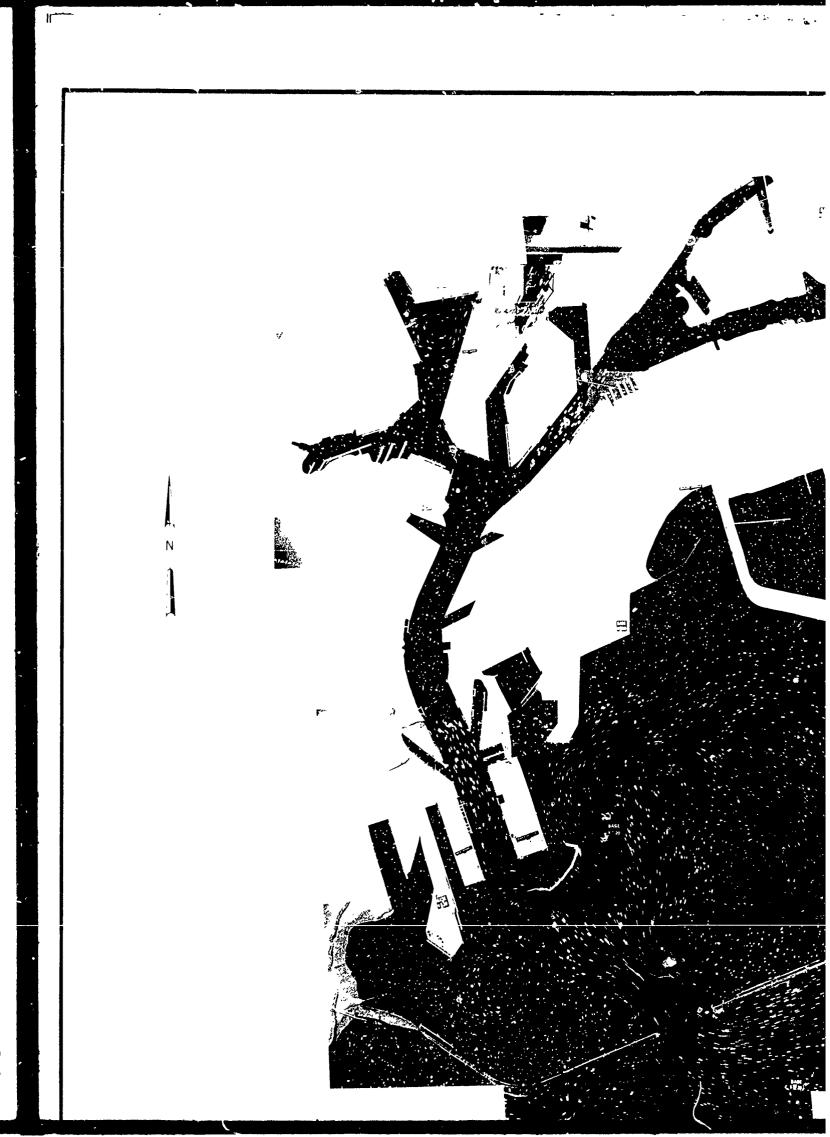


VELOCITY SCALE

PROTOTYPE LILL . .

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

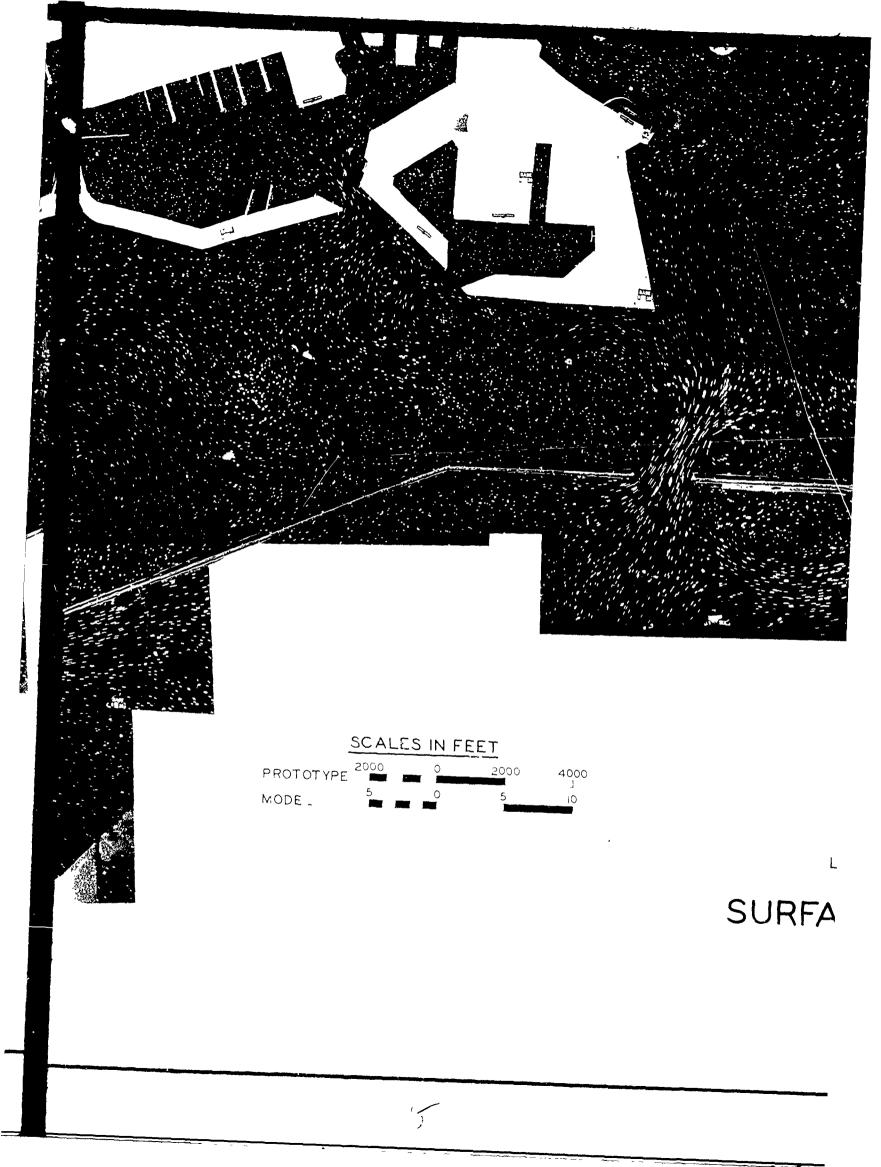
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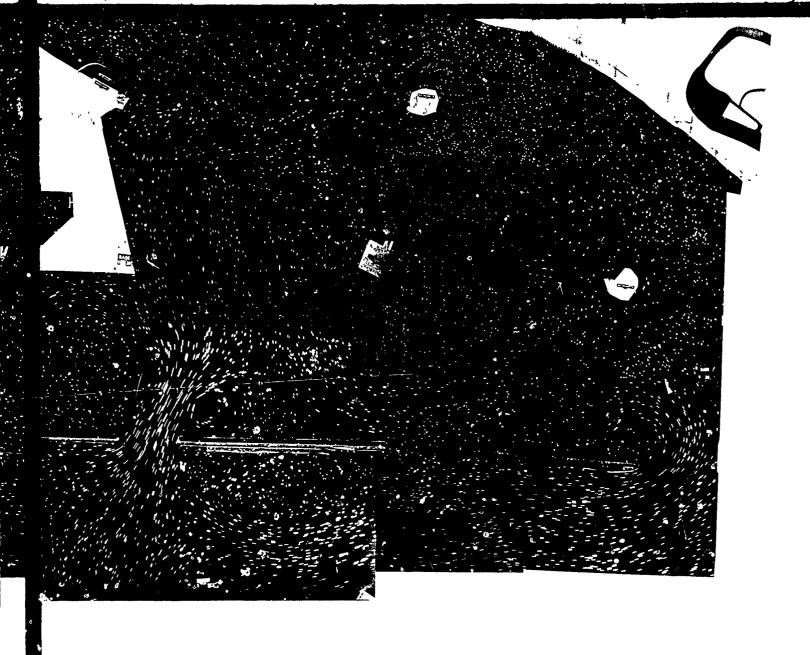












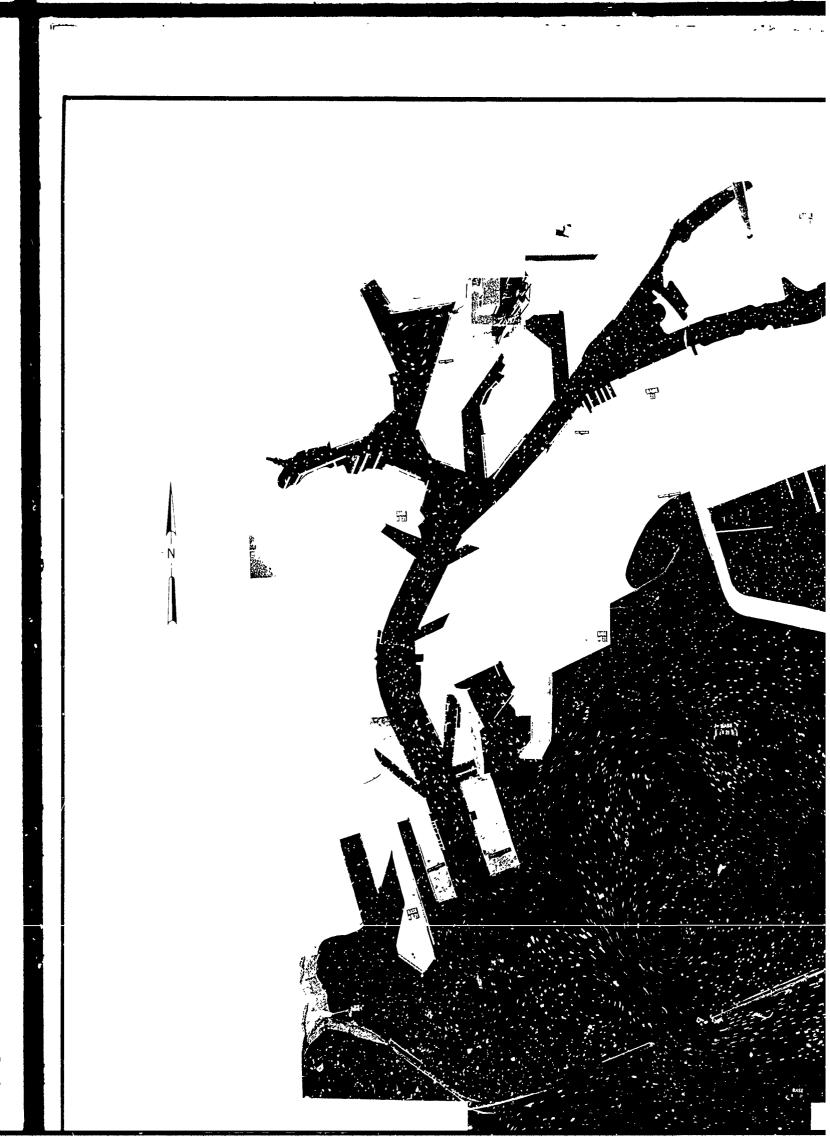
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VELOCITY SCALE

PROTOTYPE LIMIL . .

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

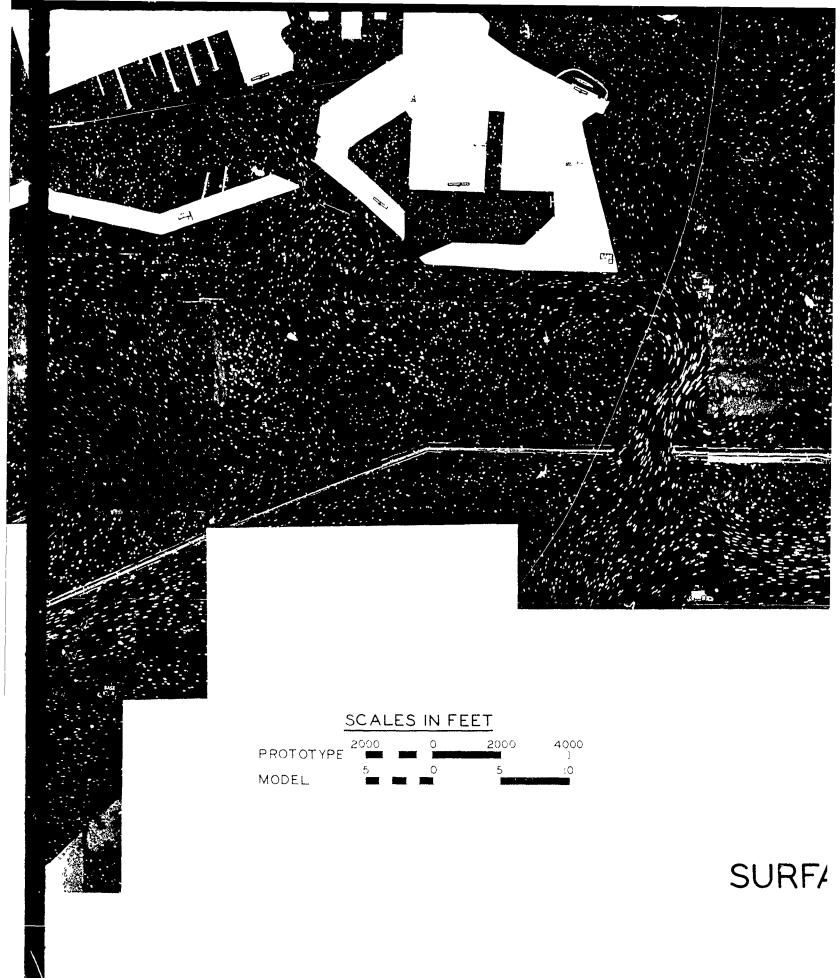
SURFACE CURRENT PATTERNS













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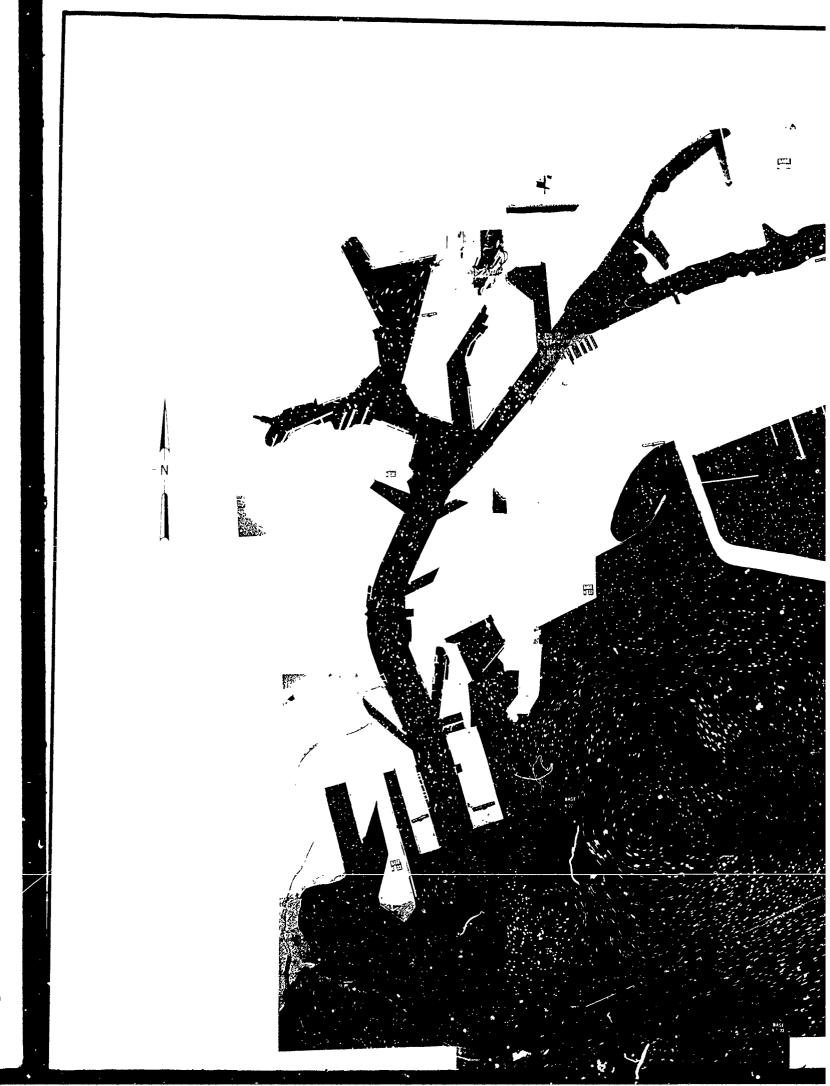
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1 0 1 2 3 FPS

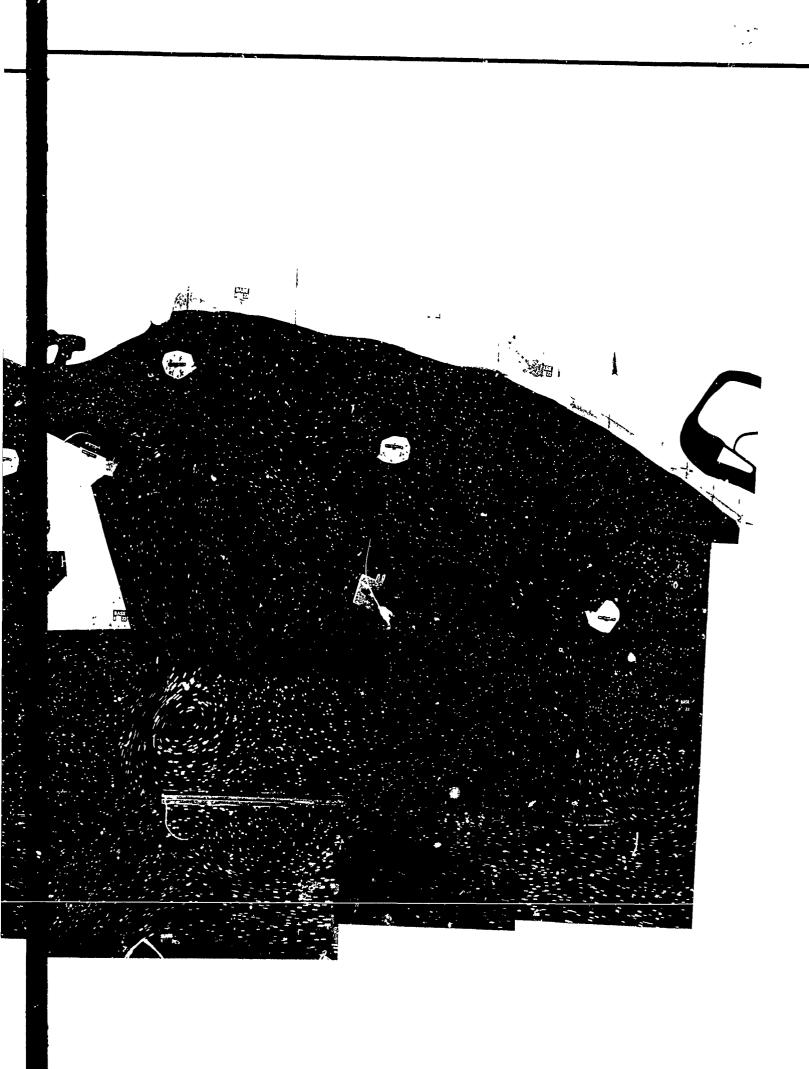
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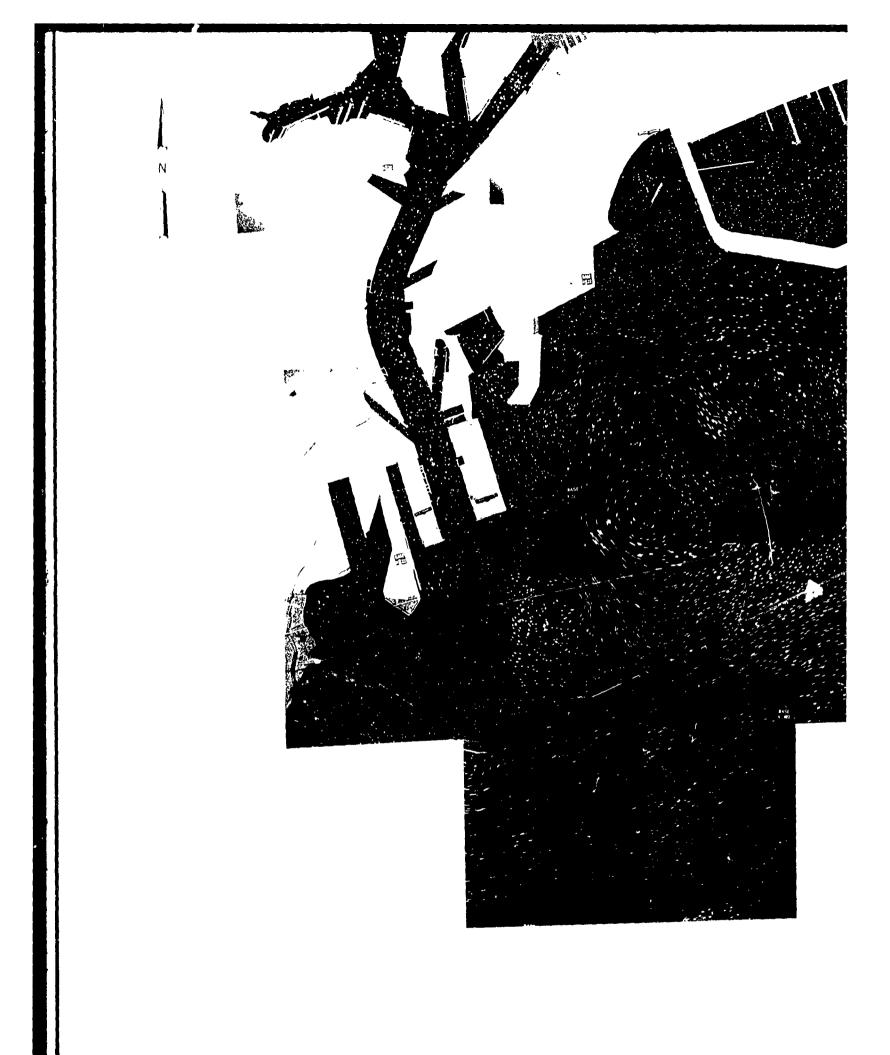
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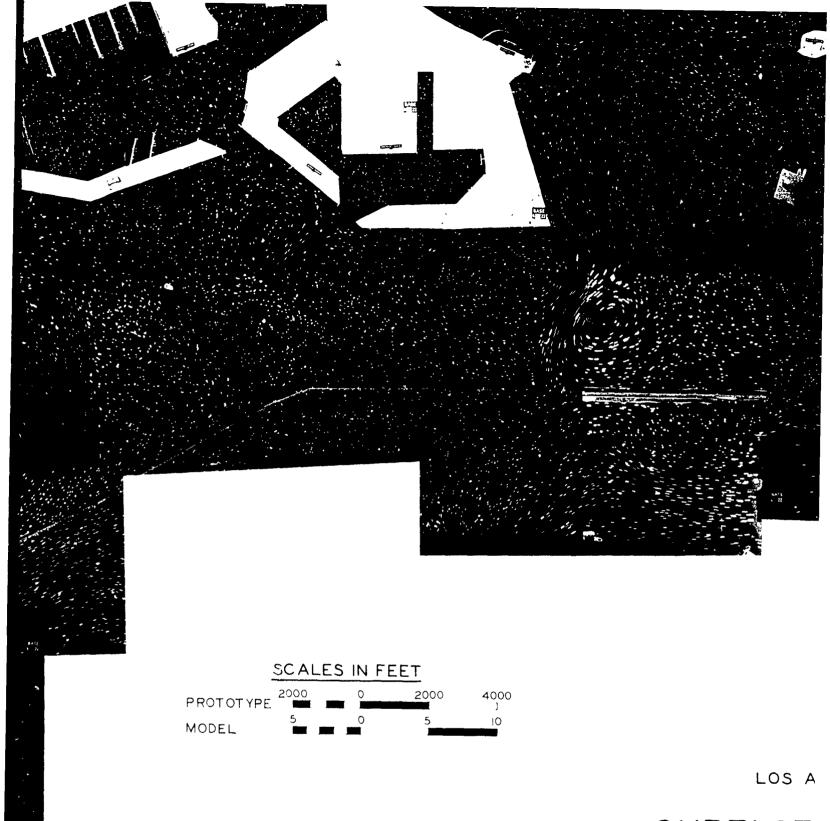
SURFACE CURRENT PATTERNS



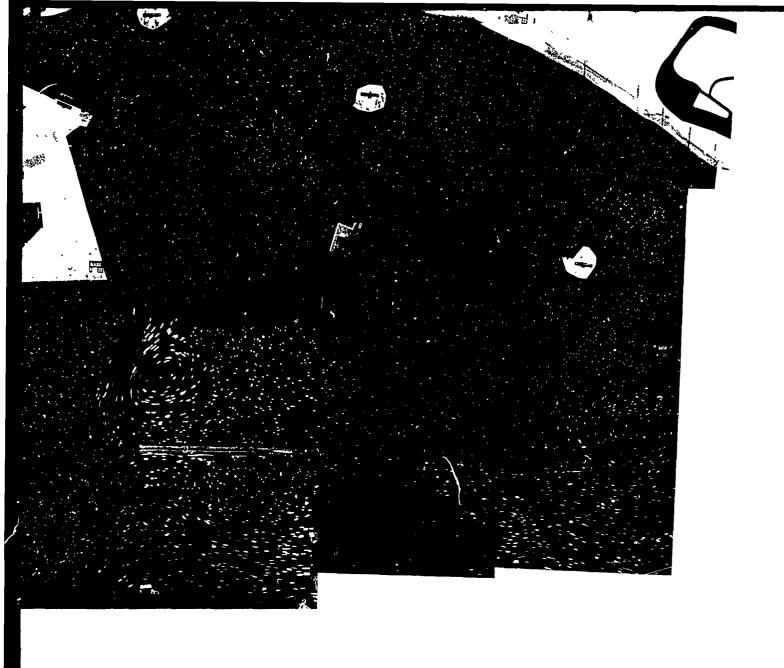








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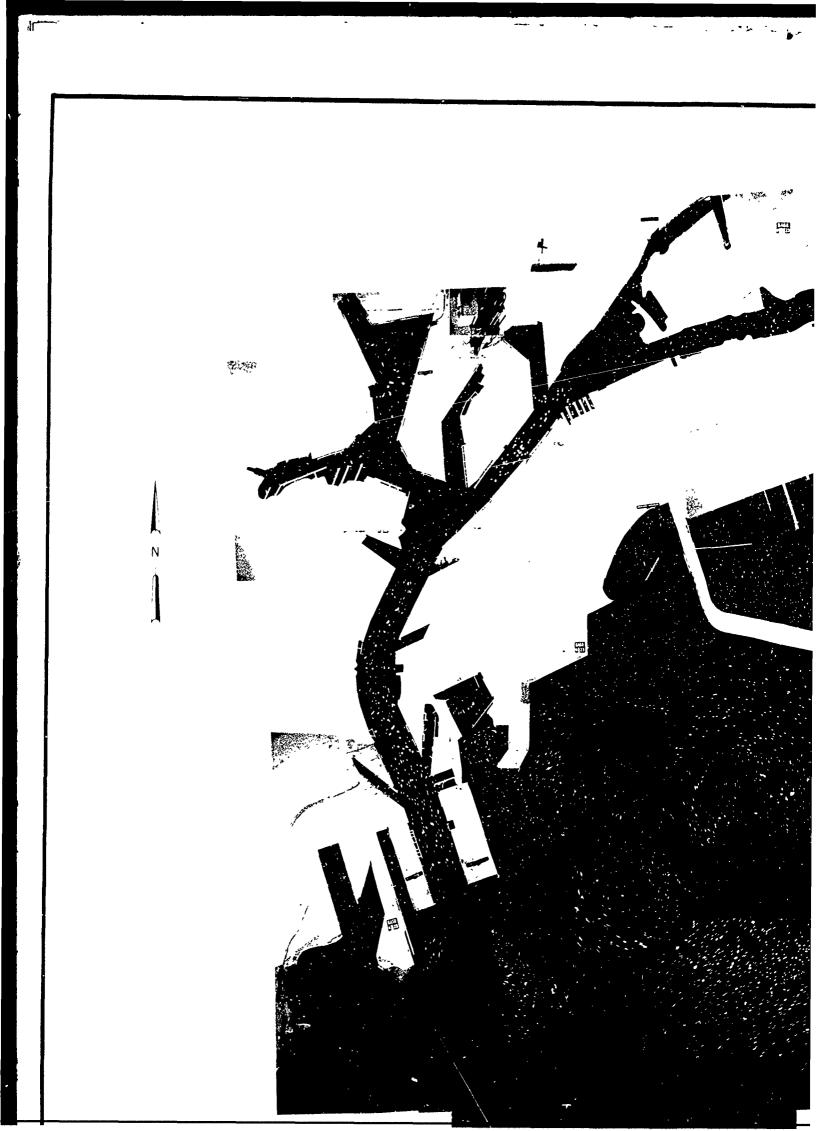
1 0 1 2 3 FPS

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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

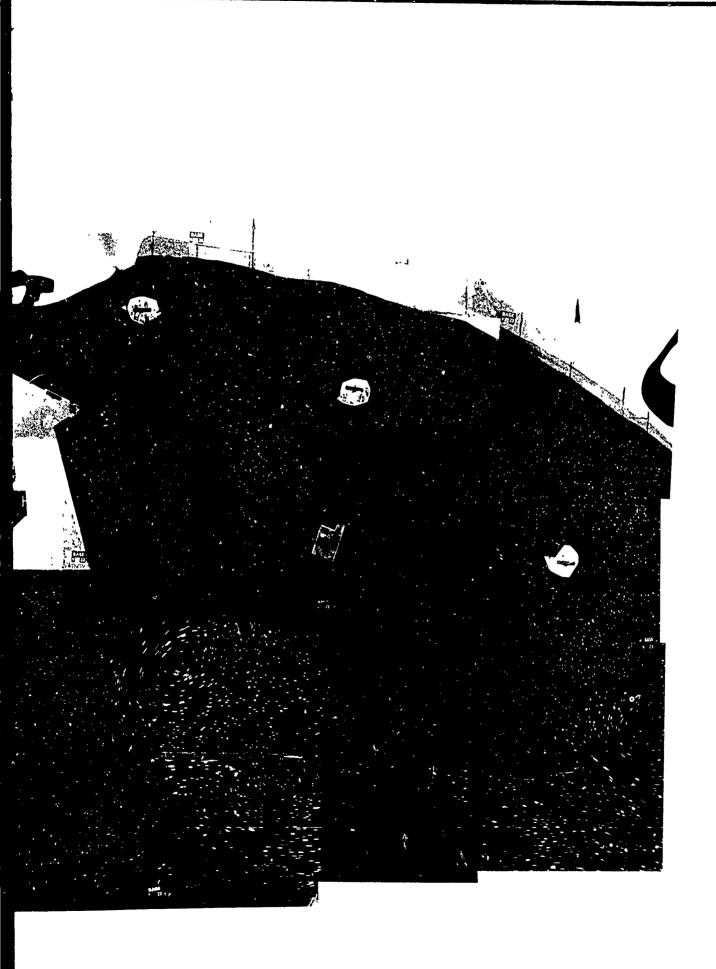
SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE HOUR 22

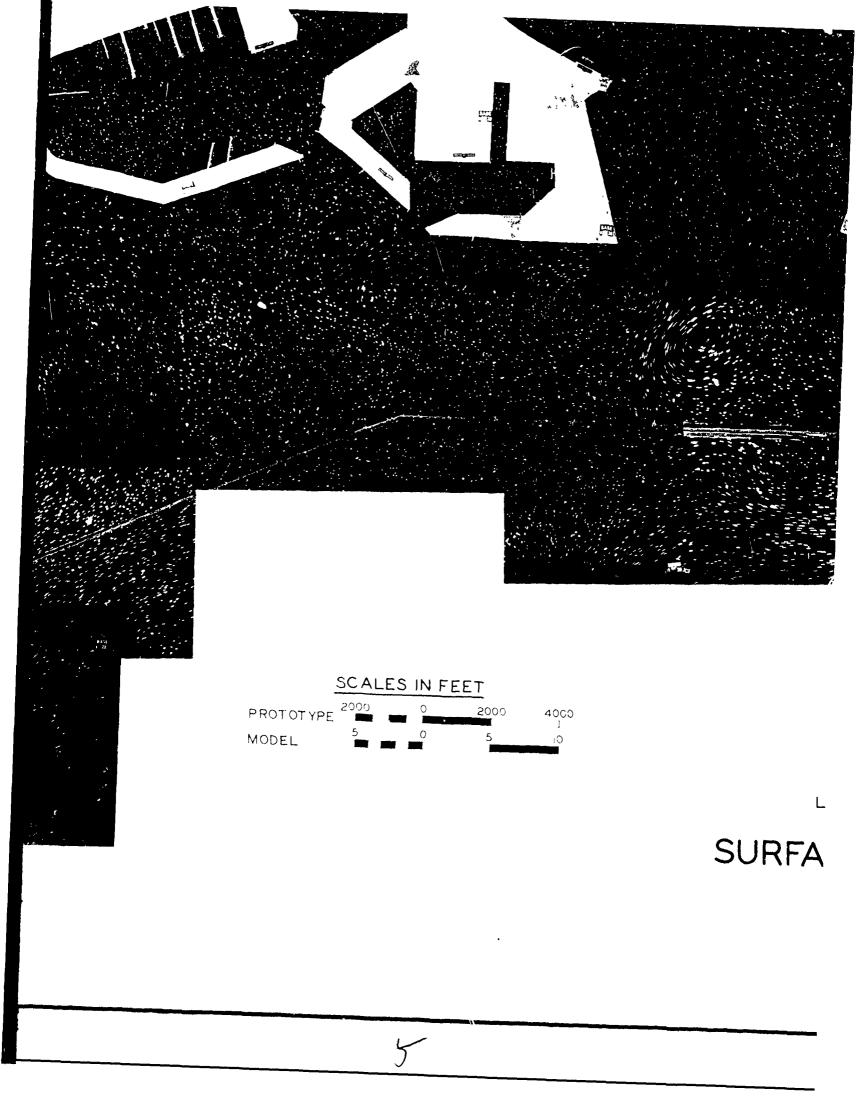


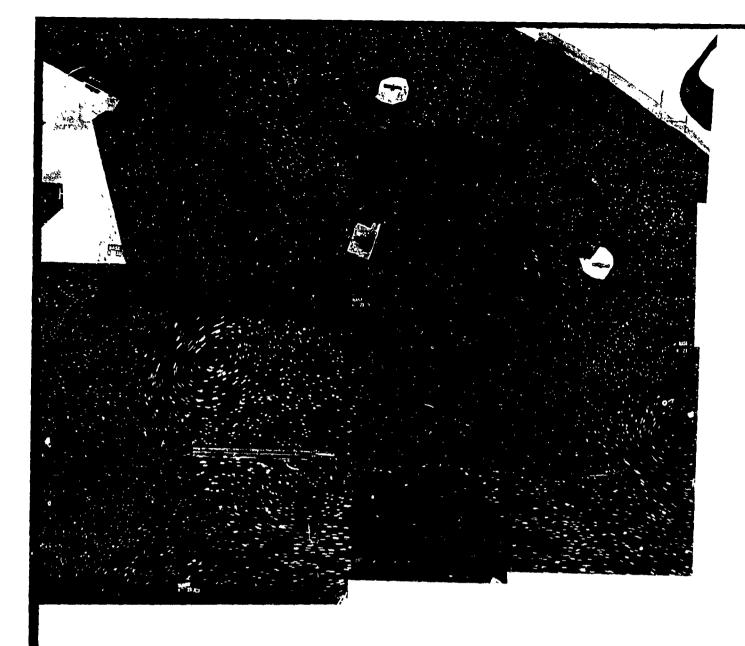










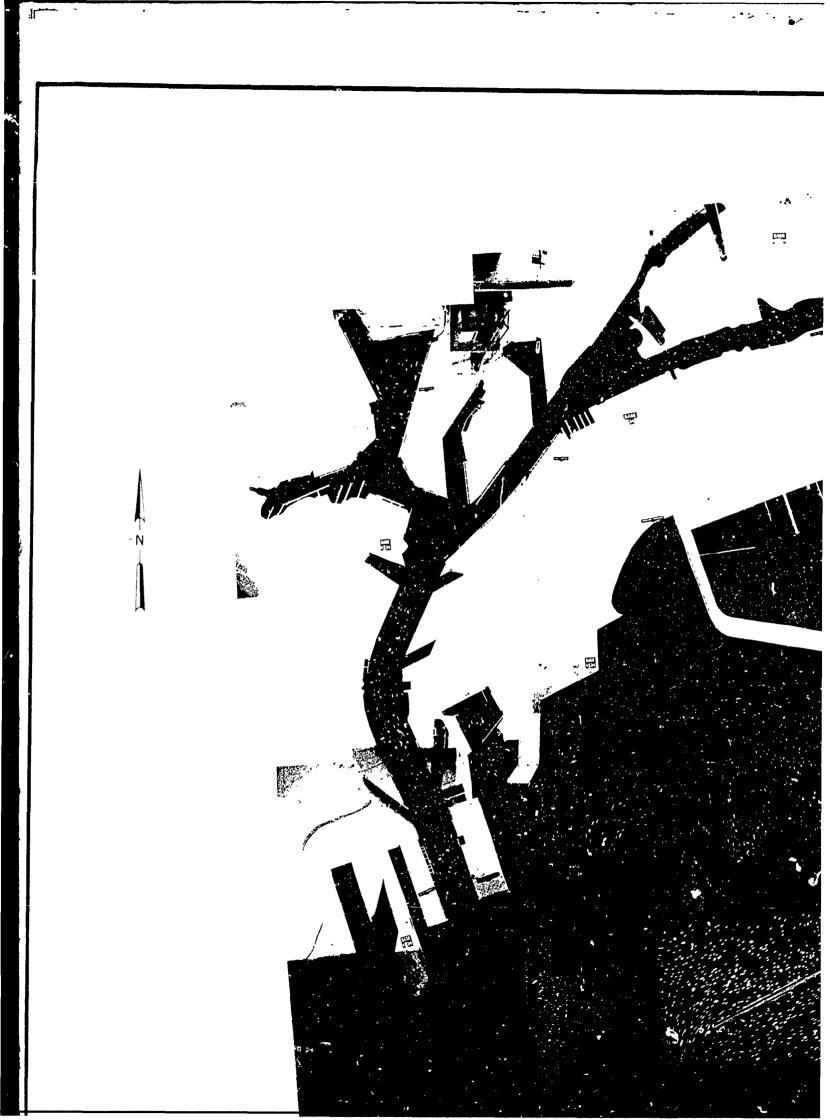


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MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

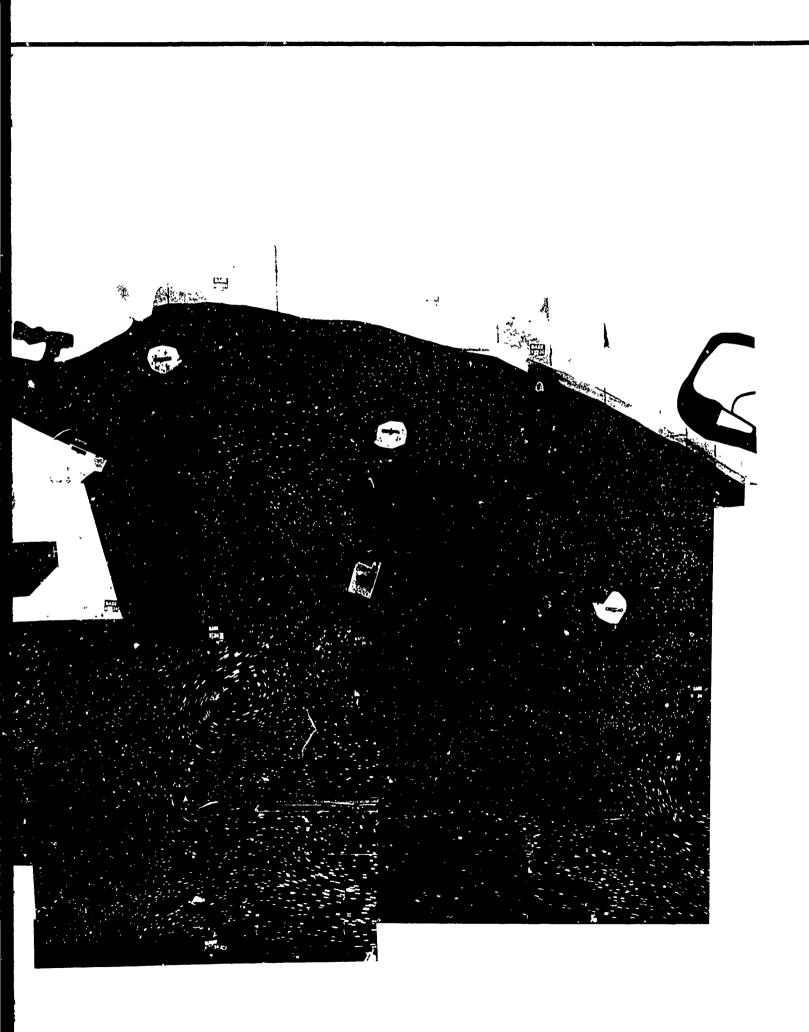
SURFACE CURRENT PATTERNS

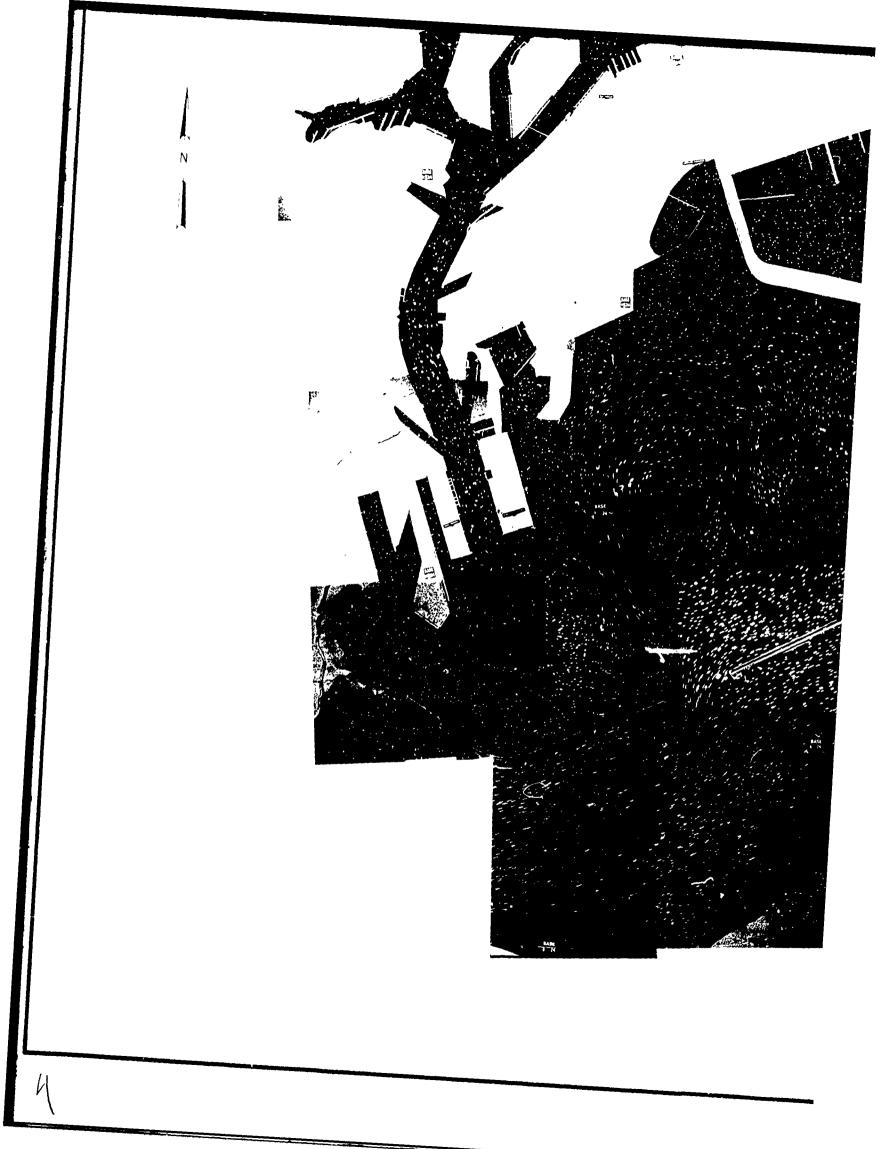
BASE TEST NEAP TIDE HOUR 23





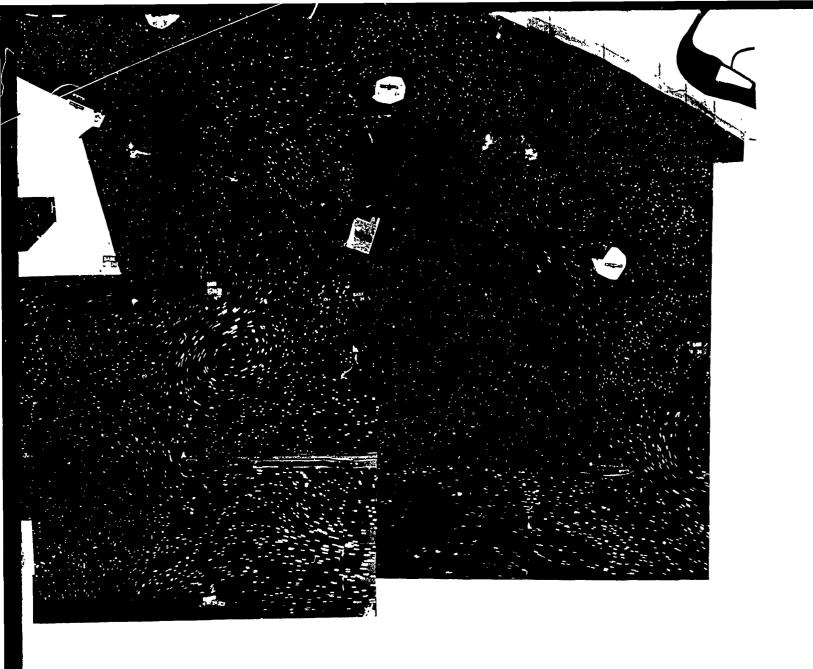








SURFACE (



4000 J VELOCITY SCALE

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PROTOTYPE LILL.

MODEL STUDY OF LOS ANGELES-LONG BEACH HARBORS

SURFACE CURRENT PATTERNS

BASE TEST NEAP TIDE HOUR 24